INSTRUCTION MANUAL FOR MODEL 3011-11

MP MASTER
MA23608

GÅRDSFOGDEVÄGEN 18 A
BOX 20036
S-161 20 BROMMA
SWEDEN
TELEPHONE 08/29 04 60

MAGNETIC AB
MANUFACTURING DIVISION • BROMMA, SWEDEN

INSTRUCTION MANUAL

FOR

RADAR MONITOR

MODEL 3011-11

MAGNETIC AB
Stockholm - Sweden

TABLE OF CONTENTS

Part 1 GENERAL DESCRIPTION

1.1 General information
1.2 Theory of operation
1.3 Mechanical
1.4 Specifications

Part 2 OPERATION

2.1 Introduction
2.2 Controls and Connectors
2.3 Operating Instructions

Part 3 THEORY OF OPERATION

3.1 Introduction
3.2 Noise Figure
3.3 Principle of Measurement
3.4 Overall Operation
3.5 Gating Circuits
3.6 Tuned Amplifier, Detector, Video Amplifier
3.7 AGC-Circuit
3.8 Metering Circuit
3.9 Alarm Circuit
3.10 Power Supply
3.11 Modulator
3.12 Noise Source
3.13 Power Measurement
3.14 Overall Description
3.15 RF-Bridge Circuit
3.16 Metering Bridge Circuit
3.17 Synchronous Detector
3.18 Amplifier
3.19 Feedback Current Generator
3.20 Meter Circuit

Digitized by the Internet Archive
in 2026

https://archive.org/details/manualsplus_12038

3.21 DC Calibration
3.22 Power Supply
3.23 Alarm Circuits
3.24 RF-Head

Part 4 SYSTEM INFORMATION

4.1 Introduction
4.2 System information
4.3 Cables and Connectors

Part 5 MAINTENANCE

5.1 Preventive Maintenance
5.2 Fault Finding and Trouble Location
5.3 Instrument System Check-Out
5.4 Noise Source Modulator
5.5 RF-Head

Part 6 INSTALLATION

6.1 Introduction
6.2 Mechanical Assembly
6.3 Electrical Setting-up

Part 7 LIST OF ILLUSTRATIONS

PART 1

GENERAL DESCRIPTION

1.1 GENERAL INFORMATION

This Radar Monitor is intended for measurements and check-out of the noise figure of the receiver and the output power from the transmitter in the waveguide. The radar monitor is a combination of a noise figure meter and a power meter.

Noise figure and power are indicated on a common instrument, which can be switched between the different channels.

1.2 THEORY OF OPERATION

The theory of operation is given in the instruction manual for each particular instrument, e.g. for the Noise Figure Meter Channel and the Power Meter Channel. The reader is therefore referred to Part 3 of this manual. Detailed specifications are given in this part. (1.4) System specifications and additional specifications are given in Part 4, SYSTEM INFORMATION.

1.3 MECHANICAL

The radar monitor is mounted in the radar cabinet. The unit can be equipped with telescopic slides. When the monitor is removed from the cabinet multipin connectors at the rear left hand side of the chassis shall be disconnected. These connectors are retained by spring latches. The connecting cable to the radar monitor is long enough to make it possible to operate the monitor outside the cabinet. This may be necessary during some setting-up adjustments. The monitor has operation controls on the panel.

1.4 SPECIFICATIONS Model 3011-11

Noise Figure Channel	Model 1141C-6
NOISE FIGURE RANGE:	1-15 dB
ACCURACY:	± 0.5 dB, 1-7 ± 0.9 dB, 7-13
INPUT SIGNAL:	
Frequency	30 MHz, center
Bandwidth	1.5 MHz ± 0.5 MHz
Impedance	50 ohm, nom.
Voltage	25 µV, min. (AGC range to 50 dB above 25 µV)
TRIGGER:	
Voltage	2-50 V
Impedance	50 ohm, nominal
Pulse Length	0.3-10 µs
PRF^{-1}	4000 µs ± 10% or 1333 µs ± 10%
PRF (internal):	250 Hz
NOISE SOURCE DRIVE PULSE:	300 µs $^{+10}_{-0}$ and 600 $^{+10}_{-0}$
PRE FIRE:	Not used
MEASUREMENT TIME:	300 µs $^{+10}_{-0}$ and 600 $^{+10}_{-0}$
DELAY (at PRF = 250 Hz):	2950 µs ±10 µs and 850 µs ±5 µs at 750 Hz
ALARM (Accuracy relative to meter)	
Range 2-13 dB (accuracy)	± 0.5 dB
Remote Alarm	Contact closure
REMOTE METER:	Not used

Note: The duty cycle of the PRF timing circuits must not be set to less than 10 per cent. Normal range 10-15 per cent.

Noise Injection Unit	Model L150-2
FREQUENCY RANGE:	1.20-1.415 GHz
Noise Source	Model L126-4
VSWR:	1.3
EXCESS NOISE:	28 dB ± 0.5
DRIVE VOLTAGE:	+28 V
Directional Coupler	Model L942A-5
COUPLING:	30 dB ± 0.5 dB
DIRECTIVITY:	>20 dB
VSWR:	1.05
Power Meter Channel	3011C-1
METER RANGE:	
Output Power	6 kW
ACCURACY:	± (8.5% + 2% of FSD), 20°C - 35°C ± (10.5% + 2% of FSD), -10°C - 55°C
ALARM: (Accuracy relative to meter)	± 4%
Remote Alarm	Contact closure
REMOTE METER:	Not used
RF-Head	Model L324-3
FREQUENCY RANGE:	1.20-1.415 GHz
COUPLING	60.79 dB
DIRECTIVITY:	>25 dB
VSWR:	1.05

Power Requirements

VOLTAGE:	115/220/230 ± 10%
FREQUENCY:	45 - 440 Hz

Dimensions

Width x Height x Depth	482 (414) x 177 x 200 (235) mm

Weight

6 kg

Equipment Specification

Radar Monitor 3011-11 consists of the following units:

Noise Channel Model 1141C-6
Power Meter Channel 3111C-1 (Output)
Pulse Generator E-001419
Power Supply for MFM E-001429
Power Supply for PM and NS Modulator (1149) E-001414

The following additional units are required in order to perform measurements with monitor 3011-11

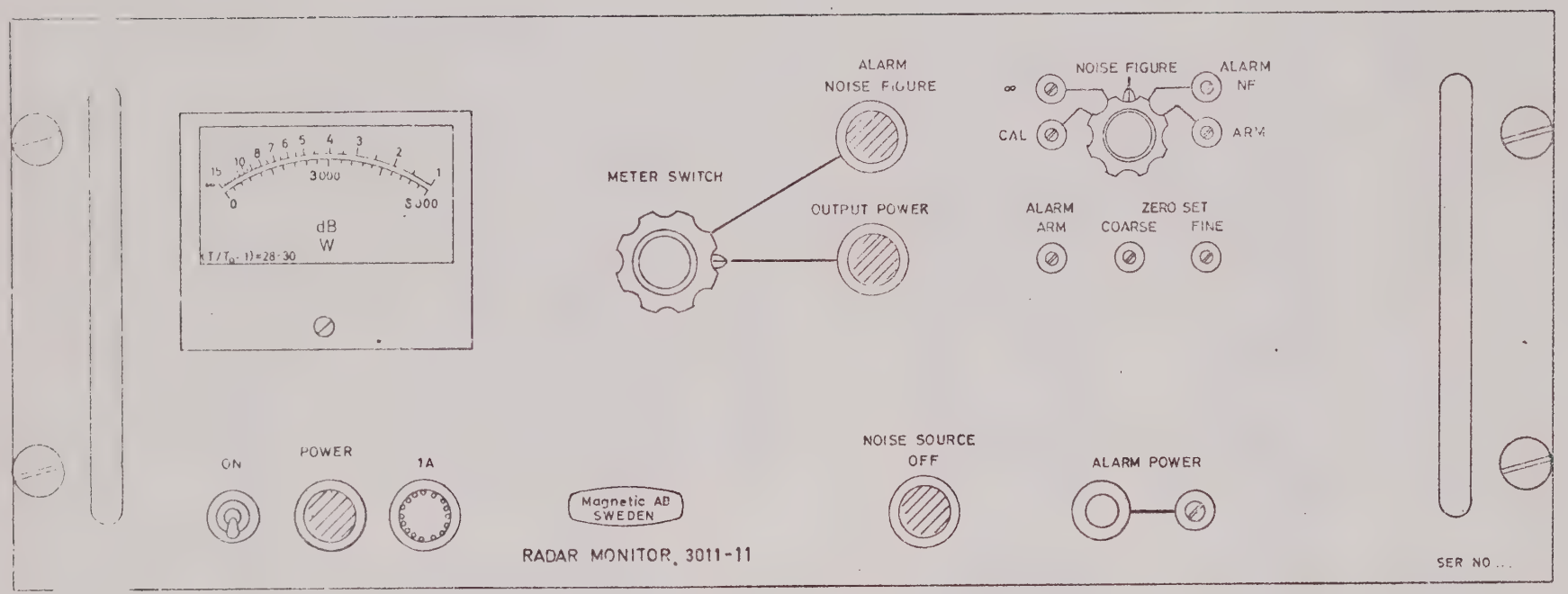
Noise Injection Unit Model L150-2 (L126-4 and L942A-5)
RF-Head Model L324-3

Supplementary Specifications

Power Consumption	50VA, max
Temperature Limits	
Operation	
Monitor	0°C to +70°C
RF-head	0°C to +55°C
Storage and Transport	-30°C to +85°C
Relative Humidity	95 % at +40°C, max

Spurious Responses

The noise figure channel is calibrated for a receiver with no image response. Should the receiver have the same sensitivity for the image as for the signal, the indicated noise figure will be 3 dB too low. This is not a fault in the instrument as it is due to the fact that the noise source is generating noise on both frequencies.


15 10 8 7 6 5 4 3 2 1 ∞
3000
0
3000
dB
W
(T/T0 - 1) = 28-30
ALARM
NOISE FIGURE
METER SWITCH
OUTPUT POWER
NOISE FIGURE
ALARM
NF
∞
CAL
ARM
ALARM
ARM
ZERO SET
COARSE
FINE
ON
POWER
1A
Magnetic AB
SWEDEN
NOISE SOURCE
OFF
ALARM POWER
RADAR MONITOR, 3011-11
SER NO ...

PART 2

OPERATION

2.1 INTRODUCTION

This part of the manual contains information on how to operate the radar monitor when connected to a radar station for the measurement of noise figure and power.

2.2 CONTROLS AND CONNECTORS

The radar monitor has all controls for normal operation on the panel. Selection of the channel metered by the instrument is done with the meter selector. There are also alarm lamps on the radar monitor panel.

CALIBRATION CONTROLS

Noise Figure Channel

FUNCTION SELECTOR (NOISE FIGURE)

This selector has four positions: CAL, ∞, NOISE FIGURE and ALARM. Position CAL and ∞ are used to calibrate the meter before measurement. Position NOISE FIGURE is used when the noise figure is to be read on the meter. The Noise Source is turned on in this position. Position ALARM is used when the alarm circuits are to be set to the level at which the alarm is wanted..

CAL

Sets the calibration point on meter.

∞

Sets the infinity point on meter.

ALARM NF

Sets an artificial noise figure on the meter. This noise figure is used when one wants to set the level at which the alarm should operate.

ALARM ARM (LEVEL)

Sets the level at which the alarm indicator energizes.

Power Meter Channel

ZERO SET COARSE FINE

These controls are used to zero the power meter bridge.

ALARM ARM (LEVEL)

This potentiometer sets the level of the alarm circuits.

ALARM POWER (Push button)

Press this button when alarm level is to be set.

ALARM POWER (Potentiometer)

This potentiometer is used to set an artificial power level for setting the alarm level of the alarm circuits.

COMMON CONTROLS AND INDICATORS

POWER

Connects line voltage to the radar monitor. There will be a one minute delay before the AGC of the noise figure meter locks in.

POWER LAMP

Indicates when line power is switched on.

METER SWITCH

Connects the meter movement to the selected channels. These are: NOISE FIGURE and OUTPUT POWER.

ALARM LAMP, NOISE FIGURE

Panel lamp, which indicates when noise figure exceeds a pre-set value.

ALARM LAMP, OUTPUT POWER

Panel lamp, which indicates when the output power is below the pre-set level.

ALARM LAMP, NOISE SOURCE OFF

Panel lamp, which indicates when the noise source is switched off.

CONNECTORS ON THE REAR OF THE CHASSIS

J1 Line power and remote alarm
J2 RF-Head
J3 Drive pulse to Noise Source
J4 Trigger Input
J5 IF Input

2.3 OPERATION INSTRUCTIONS

As the Radar Monitor is permanently installed the operator should only have to operate the controls, no cable connections being necessary as they have been made at the installation. When operating the monitor, the following procedure should be followed:

OPERATION

Noise Figure Measurement

1. Switch on the POWER switch and allow the set a one minute warm-up. (The time it takes for the AGC system to lock).
2. Set the METER SWITCH to NOISE FIGURE.
3. Set the FUNCTION SELECTOR (Noise Figure) to oo.
4. Adjust, if necessary, potentiometer oo so that the meter reads infinity (oo). Fluctuations between oo and 20 dB are normal. x)
5. Set FUNCTION SELECTOR to position CAL.
6. Adjust, if necessary, potentiometer CAL so that the meter reads CAL. x)
7. Set FUNCTION SELECTOR in position ALARM.
8. Adjust potentiometer ALARM NF till the meter reads the noise figure at which the alarm circuits should give alarm.
9. Turn ALARM ARM fully counter clockwise and then slowly clockwise till the ALARM indication energizes.
10. Set FUNCTION SELECTOR in position NOISE FIGURE and read the noise figure of the receiver on the meter.
11. Periodically switch the FUNCTION SELECTOR to oo and check that the meter reads infinity. Final adjustment of 4. and 6. shall be done about 20 minutes after the set has been switched on.
12. After setting up, it should only be necessary to switch on or off the monitor. The POWER switch shall be left in position ON.

Observe that the meter pointer is sluggish to very fast changes in noise figure, e.g. when tuning receiver input filters or setting oo and CAL.

x) Due to the high noise figures measured, the meter starts at 8 dB. This increased meter sensitivity results in increased fluctuations which are suppressed by an increased time constant in the meter. An occasional, random deflection of the meter is quite normal.

POWER MEASUREMENT

1. Set the POWER switch to ON and switch off the radar transmitter output.
2. Set the METER SWITCH to OUTPUT (REFL) power. With ZERO SET set meter pointer to zero.
3. Press ALARM POWER and set an artificial power indication with the ALARM POWER potentiometer at the level where alarm is wanted.
4. Turn ALARM ARM (LEVEL) fully clockwise for the output channel and fully counter clockwise for the reflected channel. Then turn ALARM ARM clockwise respectively counter clockwise until the ALARM lamp glows. Correct alarm level is now set.
5. Check that correct level is set by turning ALARM POWER and noting at which power reading the ALARM lamp starts to glow.
6. The power meter is now ready for use and the radar transmitter may be switched on.
7. After that the adjustments above have been made it should only be necessary to operate the POWER switch.

Note:

The Radar Monitor may also be left in position NOISE FIGURE, with the POWER switch in position on. If the performance monitor is connected to the same power switch as the radar they will be switched on together. After a short warm-up time the monitor will display the noise figure of the receiver and the output and reflected power in the wave guide.

PART 3

THEORY OF OPERATION

3.1 INTRODUCTION

This section contains a description of the different parts of the radar monitor, which consists of noise figure and power meter channels with noise injection units and RF-heads. The overall circuits are described and each important circuit is discussed individually.

3.2 NOISE FIGURE

Noise figure is a measure of the reduction of a signal-to-noise ratio caused by the internal generation of noise in an active network (receiver or amplifier) under consideration. If the network were an ideal, noiseless network, the signal-to-noise ratio would be unchanged by the network. In this ideal case, the ratio (F) of the signal-to-noise ratio at the input to the signal-to-noise ratio at the output would be 1 and the noise figure, NF = (10 log F), would be zero dB. However, all electronic devices add noise to a signal as the signal passes through, reducing the signal-to-noise ratio at the output. Mathematical expressions for the above are:

$$F = \frac{S_i/N_i}{S_o/N_o}$$

$$NF = 10 \log F$$

$$= 10 \log \left(\frac{S_i/N_i}{S_o/N_o}\right)$$

$$= 10 \log (S_i/N_i) - 10 \log (S_o/N_o)$$

Where: NF = noise figure (dB)

This last equation shows that the noise output of any network comprises two contributions: GKTB, the amplified input noise, and (F-1) GKTB which must then be the additional noise generated by the network itself. The temperature, T, in each term is a function of each source of noise. For the second term, T is always the ambient temperature of the device being measured and, in calibrating the noise figure meter, is taken to be 290°K. When only random noise is present at the input of the network, T in the first term is also ambient temperature. In this case, the equation for output noise is:

$$N_1 = GKT_0B + (F-1)GKT_0B$$

where:

T_0 = ambient temperature (290°K)

N_1 = output noise with random (ambient) input noise

If an external source of noise power is placed at the input to the network, the equation for the output noise (N_2) becomes:

$$N_2 = GKTB + (F-1)GKT_0B$$

where T is the effective temperature at the input created by the new noise power source. The temperature in the second term remains T_0, the ambient temperature of the device being measured.

Subtracting and adding GKT_0B at the first term of the last equation:

$$N_2 = GKTB - GKT_0B + GKT_0B + (F-1)GKT_0B$$

$$N_2 = GK(T-T_0)B + GKT_0B + (F-1)GKT_0B$$

$$N_2 = GKT_0B\left(\frac{T}{T_0} - 1\right) + GKT_0B + (F-1)GKT_0B$$

As the final two terms of the last equation are N_1, the output noise with random input, the member

$$\left(\frac{T}{T_0} - 1\right)$$

of the first term can be considered an excess-noise ratio, D.

Taking the ratio of N_1 to N_2 and cancelling the term GKT_0B:

$$\frac{N_1}{N_2} = \frac{F}{D + F}$$

Solving for F:

$$FN_2 = N_1(D + F)$$

$$F(N_2 - N_1) = N_1D$$

$$F = \frac{N_1D}{N_2 - N_1}$$

$$F = \frac{D}{(N_2/N_1) - 1}$$

Noise figure, NF is 10 log F and:

$$NF = 10 \log \frac{D}{(N_2/N_1) - 1}$$

$$NF = 10 \log D - 10 \log \left(\frac{N_2}{N_1} - 1\right)$$

$$NF = 10 \log \left(\frac{T}{T_0} - 1\right) - 10 \log \left(\frac{N_2}{N_1} - 1\right)$$

In the operation of the noise figure meter the temperature T_0 is assumed to be constant at 290°K. With a specified noise source, the input noise power for the development of N_2 is known and the temperature T is therefore constant. The only variable then in the last equation is the ratio

To determine the noise figure of a radar system under test, with the noise figure meter, a calibrated noise source deliveres a pulse of known noise level into the radar system in order to generate an N_2 pulse for measurement. The noise source is then deactivated and a portion of the random ambient noise from the radar system is sampled (N_1). The noise figure meter then measures the difference between these two pulses. In order to use this difference for the determination of NF, it is necessary to make this difference between the heights of these pulses be a function of their ratio. This is done by holding N_1 at a constant level, regardless of internal noise, by using AGC. The gain of the noise figure meter is set by AGC during the appearance of each N_1 pulse at the detected output. The amount of this AGC is determined by the magnitude of the N_1 pulse into the noise figure meter. This gain setting is then held constant for the appearance of the N_2 pulse. The difference in pulse heights is now a function of N_2/N_1 and the meter is appropriately calibrated to display noise figure directly in dB.

This principle of measurement is illustrated in fig 3-1. Under any conditions, the N_2 output of the radar system is the same as the N_1 output with the addition of the amplified noise source signal. AGC in the noise figure meter always brings the N_1 pulse to a constant level. To do this, the AGC must either expand or compress all the constituents of the radar system output. The amount of AGC used to perform this level setting is held during the appearance of the N_2 pulse. Thus the constituents of the radar system output during N_1 (the internal noise of the radar system and the amplified random ambient noise), after removal of the noise source signal, are acted upon in the same manner (expanded or compressed) to the same degree as those

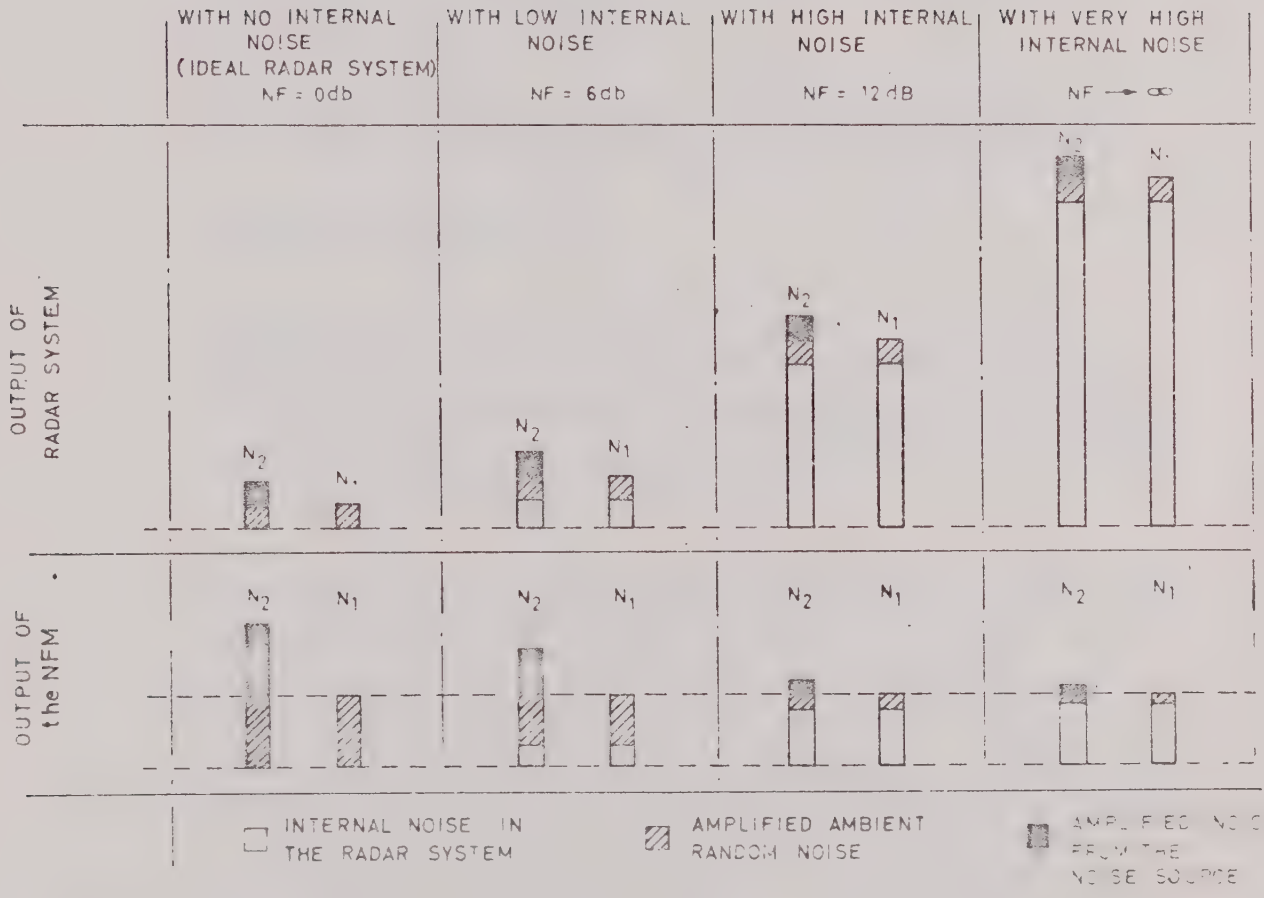

WITH NO INTERNAL NOISE (IDEAL RADAR SYSTEM) NF = 0db
WITH LOW INTERNAL NOISE NF = 6db
WITH HIGH INTERNAL NOISE NF = 12 dB
WITH VERY HIGH INTERNAL NOISE NF → ∞
OUTPUT OF RADAR SYSTEM
OUTPUT OF the NFM
N2
N1
INTERNAL NOISE IN THE RADAR SYSTEM
AMPLIFIED AMBIENT RANDOM NOISE
AMPLIFIED NOISE FROM THE NOISE SOURCE

Figure 3 [illegible] Diagram

The difference between the heights of the N_2 and N_1 pulses, under a given set of conditions, is the amplified noise source signal which was compressed, along with the other constituents of the N_2 pulse, to maintain a constant-level N_1 pulse. The more internal noise present in the radar system, the more the noise source signal must be compressed. As the internal noise in the radar system increases, then, the smaller will be the N_2 pulse at the output of the noise figure meter.

This difference in height (between N_2 and N_1) drives a meter calibrated directly in dB of noise figure.

3.4 OVERALL OPERATION

Operation of the Noise Figure Meter is described with reference to the block diagram, fig 3-2 and the simplified waveform and timing diagram, fig 3-3. The circled numerals on fig 3-2 point out the location of the waveforms shown in fig 3-3.

The noise figure meter operates during the "dead time" of the radar system. "Dead time" is that portion of the radar period after all achievable echoes have been received and prior to the next transmitted burst. The radar delivers a trigger to the gate circuitry in the noise figure meter. The gate circuitry then develops three output signals (see fig 3-4). During each successive radar period, the gate circuitry develops a gate and alternately channels each gate to one of two gate paths. For every other radar period, a gate pulse appears on the N_1 gate path. During the alternate radar periods, a gate appears on the N_2 gate path.

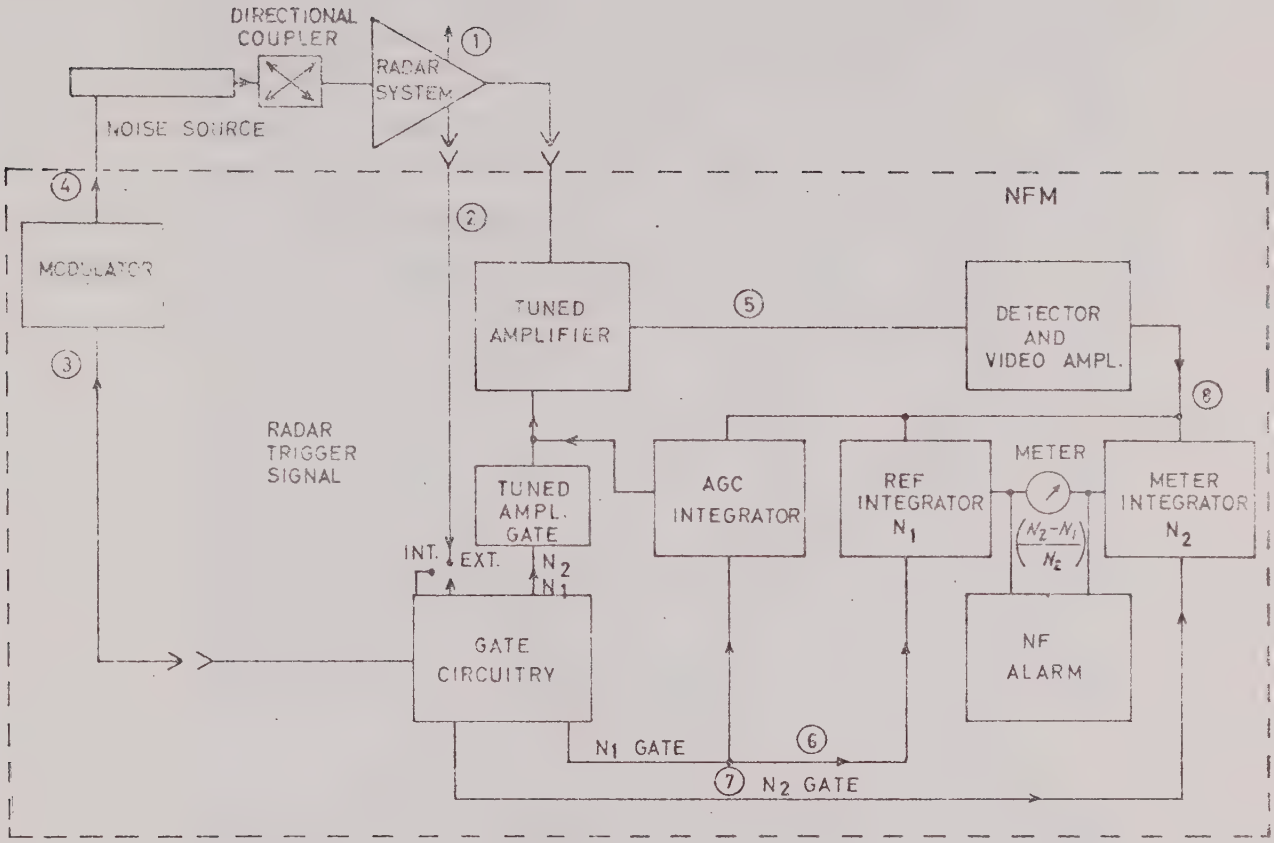


FIGURE 3-2. BLOCK DIAGRAM

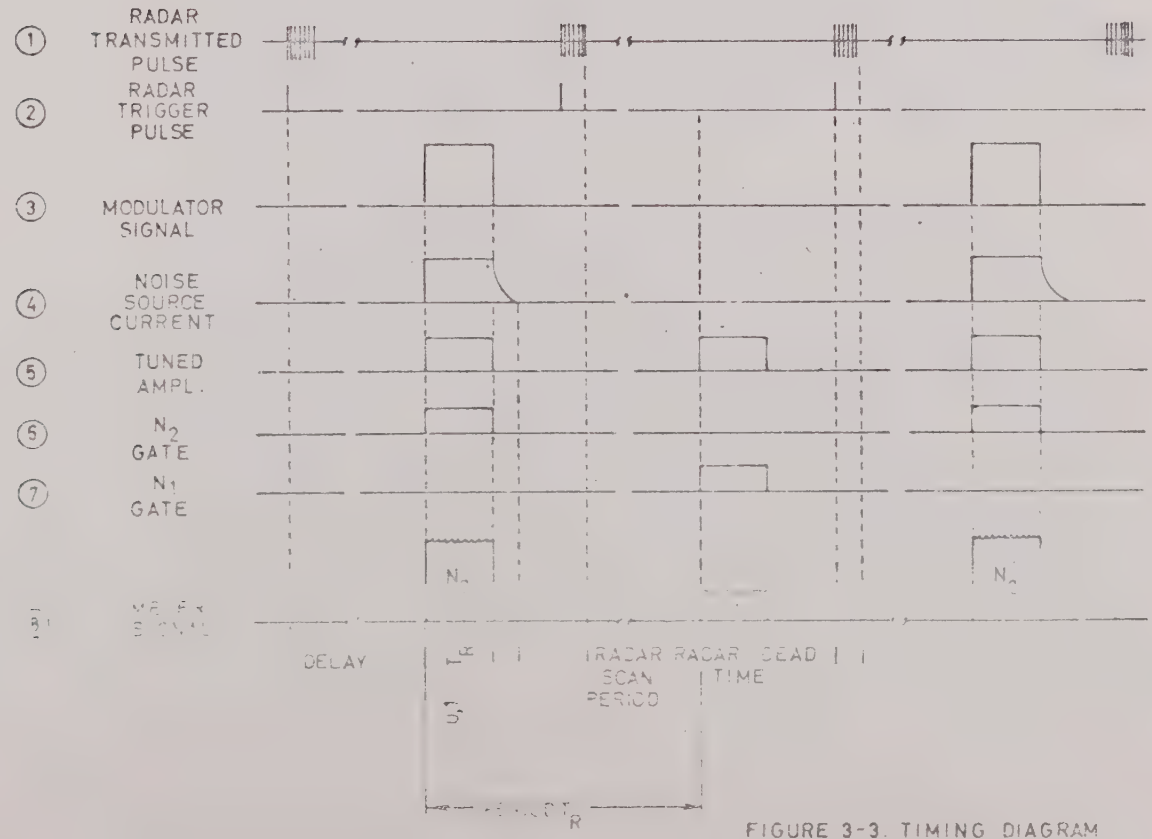


FIGURE 3-3. TIMING DIAGRAM

The third output from the gate circuitry is used to activate the noise source modulator during the radar periods which correspond to the generation of N_2 gate pulses. This modulator signal starts 100 microseconds prior to the N_2 gate so that the noise source gas discharge tube can be fired and the current reach its stable maximum. The modulator activates the noise source during each N_2 gate. The noise source is quiescent during the N_1 gate. (For solid state noise generators, the 100 us pre fire pulse is not required.)

Both the N_1 and N_2 gates are fed in common to a gate generator which gates on the tuned amplifier to pass the radar system IF signal. The output of the tuned amplifier, appearing during both the N_2 and N_1 gates, is detected and amplified and sent to three integrating circuits. These integrating circuits are individually gated by either the N_2 or N_1 gate.

During the N_1 gate, the AGC integrator is activated and the N_1 video (with the noise source turned off) sets the gain of the tuned amplifier in order to maintain a constant-level N_1 video. The reference integrator is also gated on by the N_1 gate and establishes and maintains the reference signal on the one side of the meter circuit.

During the N_2 gate, the meter integrator is switched on. Because the integrating action of the AGC and reference integrators holds a constant gain in the tuned amplifier and a constant reference signal to the meter, both determined by the preceding N_1 video, the N_2 video, passed by the meter integrator to the other side of the meter circuit, is a measure of noise figure. The resulting difference in current is then displayed as noise figure on the meter and is fed to

3.5 GATING CIRCUITS

The gating circuits are shown in block diagram form in fig 3-4 and in schematic form in the circuit diagram for the Pulse Unit.

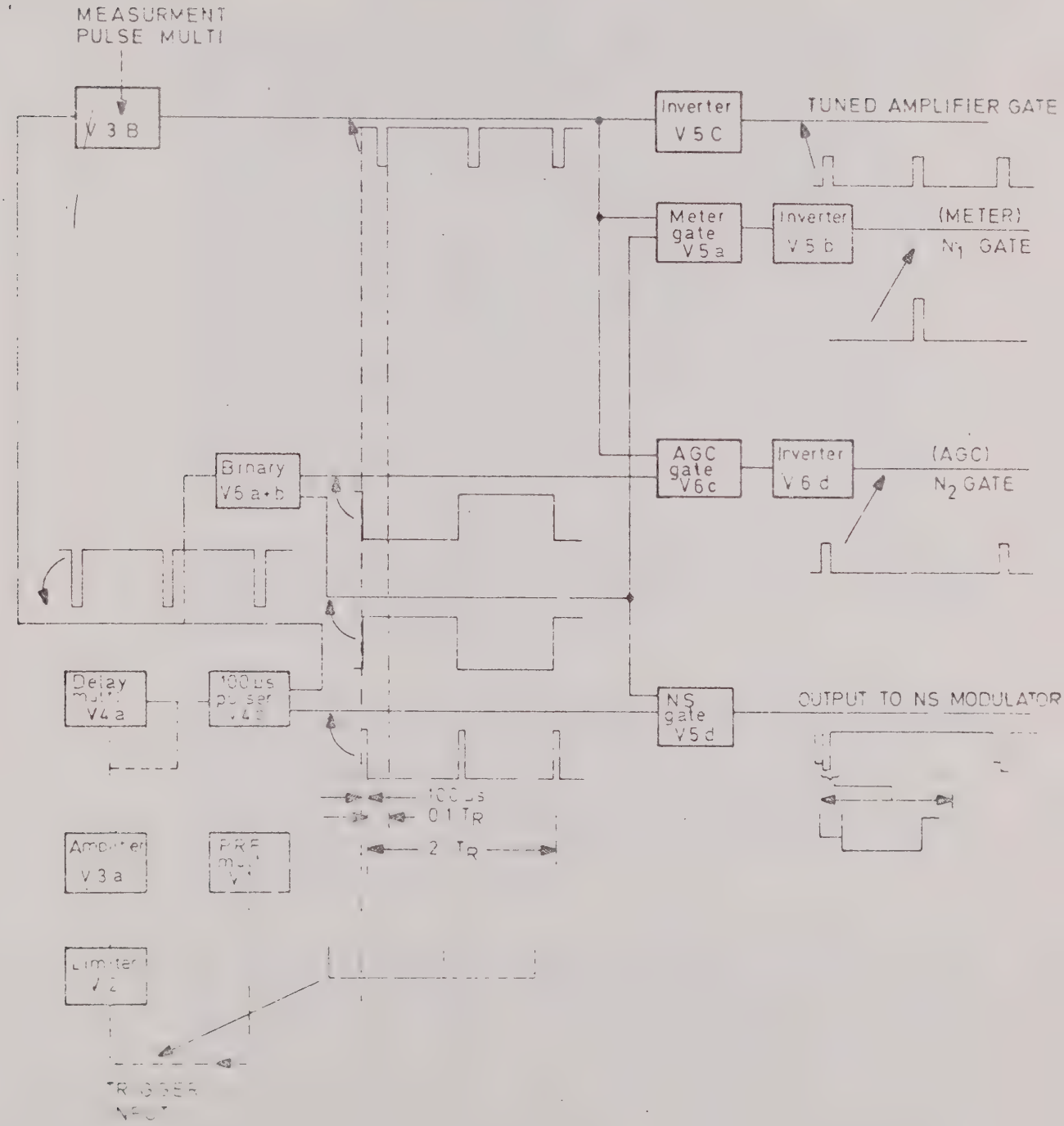
The input trigger from the radar system is a positive pulse. This pulse is usually occuring at the same time as the transmitter pulse. A pulse anywhere in the PRF period may be used to trigger the noise figure meter. If a pulse is available in the radar system, when the measurement cycle is to take place, it can be used directly to start the measurement cycle.

The input trigger pulse is amplitude limited by the circuit in the base of V2, which inverts the pulses before they are fed to V3a. V3a is one half of an integrated circuit and it is used as an amplifier. This amplifier drives a monostable multivibrator V4a. This multivibrator has a period depending on the required delay of the trigger pulse. The delay can be set with potentiometer R9.

The output from the delay multivibrator V4a triggers the monostable multivibrator V4b. This multivibrator has a period of 100 us. The output of this 100-microsecond pulse is fed to another monostable multivibrator, V3b. The period of this multivibrator is set by potentiometer R12 and is set to the required measurement time of the system and is not less than 10 per cent of the radar period. The multivibrator gives an output pulse for each trigger pulse in.

If a pulse is available from the radar system when the measurement is to take place, the delay generator need not be used. The 100-microsecond multivibrator [illegible] action of V4a.

GATING CIRCUITRY



The output of the 100-microsecond multivibrator is fed to the bistable multivibrator V6, consisting of two gates coupled as a bistable multivibrator. This binary switched by each output pulse from V4b.

The output from the binary, V6, is mixed in the AGC gate V6c with the pulses from the Measurement Pulse Generator V3b. This results in a chain of pulses occuring during every alternate radar period. The other output from the binary is mixed in the meter gate V5a with the same output from the Measurement Pulse Generator, V3b. The output from V5a is then a chain of pulses occuring midway between the output pulses of V6c. The output from V6c is inverted by V6d and is the N_2 gate, which is used to gate on the meter integrator. The output from V5a is inverted by V5b and is the N_1 gate, which is used to gate on the AGC integrator and the reference integrator for the meter.

A pulse is taken from the Measurement Pulse Generator, V3b, is inverted by V5c and is then used as a gate pulse for the tuned amplifier.

The remaining job of the gating circuitry is to provide gating for actuating the modulator 100 microseconds [x] before and during the N_2 pulse. This is done to bring the noise source up to operating current prior to the N_2 gate and to allow the noise source to deliver its output during the N_2 gate.

To accomplish this, the 100-microsecond pulses from V4b are mixed with pulses from the Measurement Pulse Generator, V3b through Z5 and Z6 and then mixed with the output from the binary V6a. This pulse, which is coincident with the N_2 pulse, but starts 100 microseconds earlier, is used to pulse the modulator, which activates the noise source. The pulses to the modulator are negative and all the other output pulses are positive.

x) Age [illegible] this pulse generator [illegible] reduced to 75 μs.

For maintenance purposes the gating circuits may be operated on the internal PRF generator V1, a UJT free running multivibrator. The PRF is set by R1. The output from this multivibrator is taken to the trigger input.

For special purposes the two potentiometers R9 and R12 may be mounted externally to the PC board.

3.6 TUNED AMPLIFIER, DETECTOR, VIDEO AMPLIFIER and DC RESOTRER

The Tuned IF Amplifier, Detector, Video Amplifier and DC Restorer are shown in the schematic diagram for the Plug-in Unit.

The intermediate frequency (30 MHz with a 1 MHz nominal bandwidth) from the radar system being measured is connected to the IF INPUT connector J1. The signal passes through four tuned stages of amplification, transistors V1, V2, V3 and V4. AGC emitter follower V5 biasis V1, V2 and V3 or whenever the N_1 or N_2 gate is generated. The output of V5 is controlled by the AGC feed-back loop (activated only during N_1)1 Therefore the output of V4 is a constant for all N_1 pulses while the gain of the Tuned Amplifier during any N_2 pulse is the same as for the preceding N_1 pulse.

The amplified IF signal is next detected by crystal rectifier CR1. The diode operates as a square-law [illegible] so that its output voltage is a linear [illegible]

To provide for fluctuations in the operating characteristics of the video amplifier, the output of the emitter-follower V10 is AC coupled to a DC Restorer V11, which clamps the video signal.

3.7 AGC CIRCUIT

The gating and integrating circuitry for the AGC is shown in Plug-in Unit and in simplified schematic diagram fig 3-5. This circuitry consists of transistors V17, V16, V15 and V5. The N_1 gate pulse from the gating circuitry appears at the base of AGC integrator gate, V17, and allows the AGC integrator V16, to conduct. Capacitor C30 charges to the level determined by the N_1 video at the base of V16. Resistor R54 is the discharge network for capacitor C30. The RC time constant of the discharge circuit is long so that the junction of rectifier Z10 and capacitor C30 stays at a nearly constant potential until the next N_1 pulse appears.

The tuned amplifier gating signal from the gating circuitry is fed to the input of the tuned amplifier gate, V15, turning that stage off. Crystal rectifier Z7, which has been conducting and holding the tuned amplifier turned off, now cuts off. Crystal rectifier Z6 is now allowed to determine the AGC level passed to the tuned amplifier. This level is governed by the charge established on capacitor C30, further filtered by capacitor C28. This output, established by the N_1 video and held during the N_2 video, is fed for all input pulses to the AGC emitter follower, V5, in the tuned amplifier circuit. (See circuit diagram for the Plug-in Unit.)

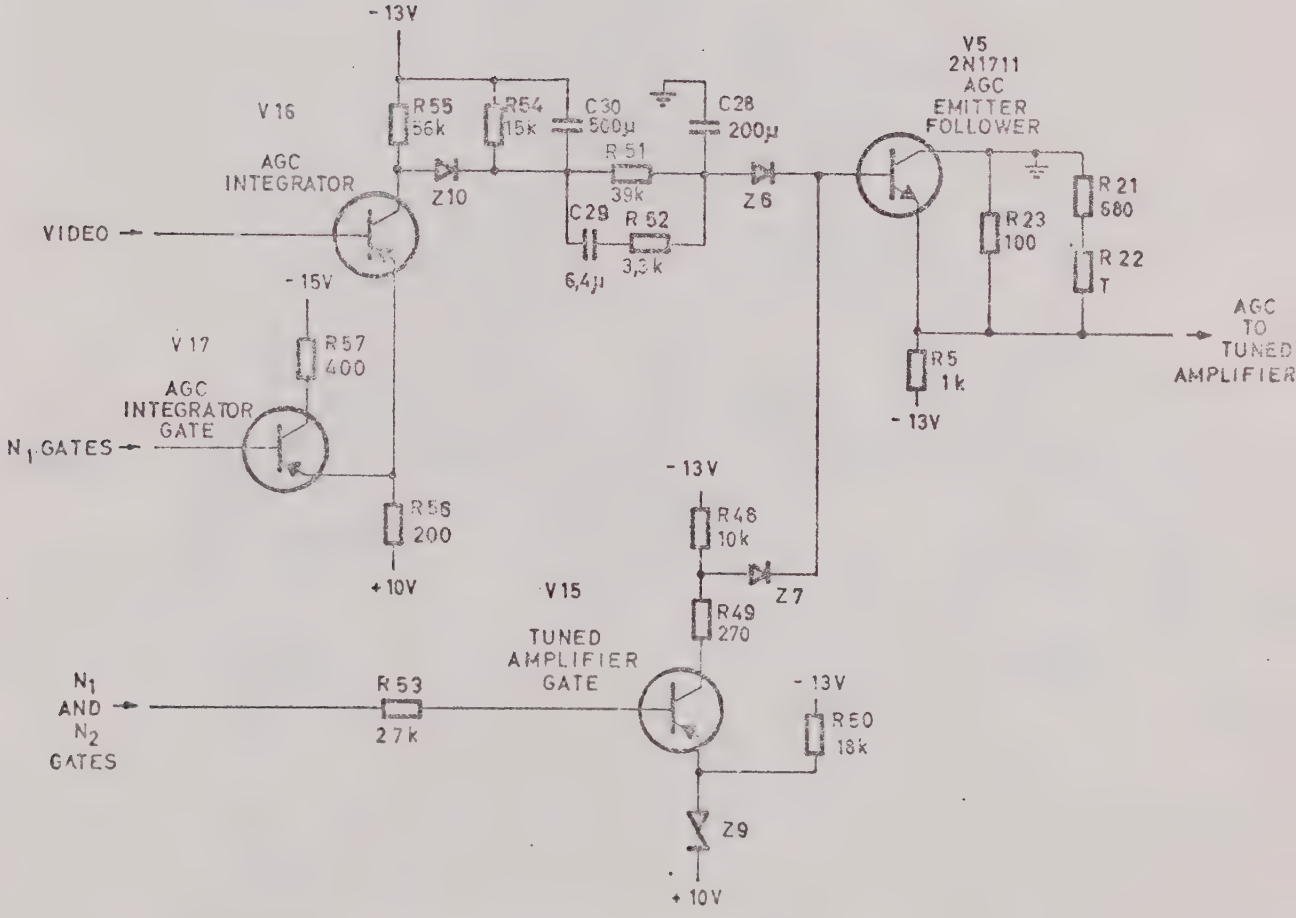


Figure 3-5. AGC Circuit, Simplified Schematic Diagram.

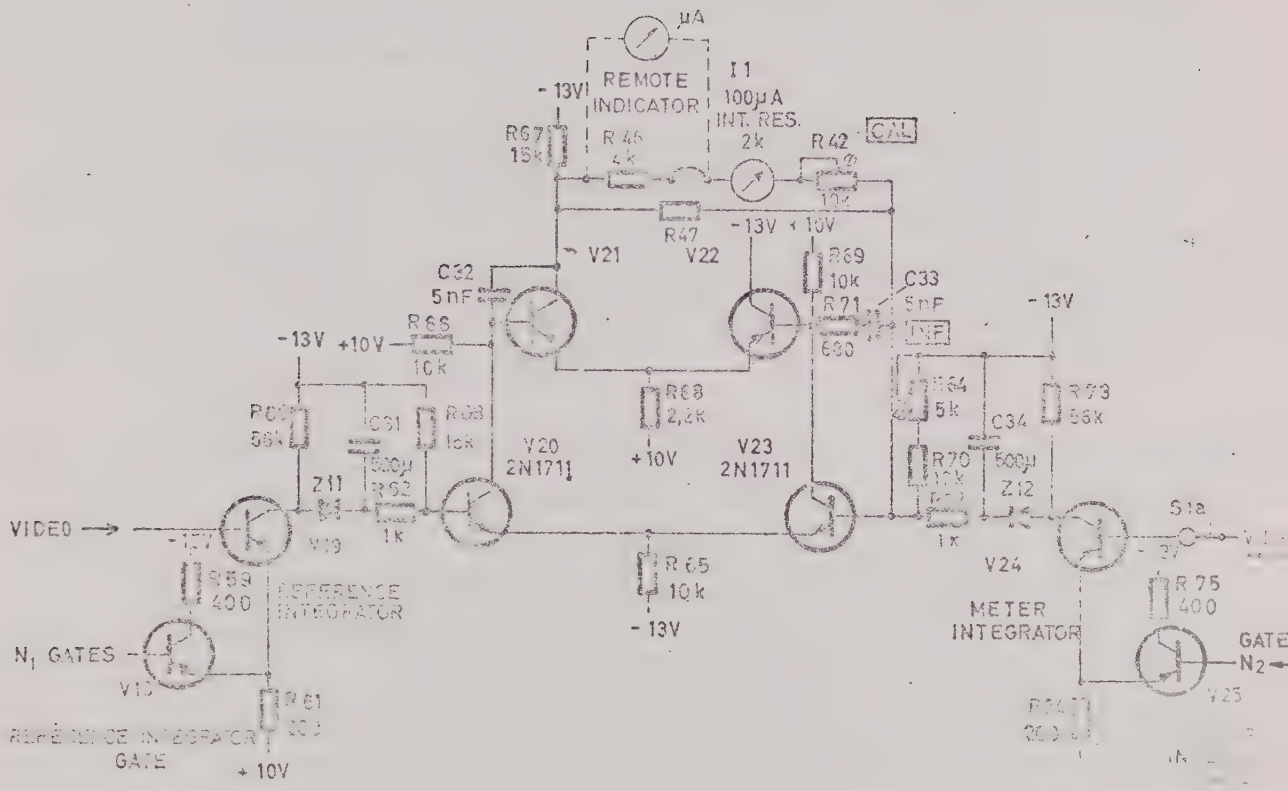


Figure 3-6. Metering Circuitry, Simplified Schematic Diagram

3.8 METERING CIRCUITRY

The metering circuit is shown in simplified schematic diagram, fig 3-6, and in the schematic diagram for the Plug-in Unit. The reference side of the circuit (V18, V19 and V20) provides a constant reference signal for the metering circuit, determined by the AGC-controlled N_1 video. The metering side of the circuit (V21 through V25) draws a current through the meter which decreases with increasing noise figure.

The N_1 gate pulses from the gating circuitry are transmitted by the reference gate, V18, to the reference integrator, V19, allowing current to flow through that transistor, charging capacitor C31. Since the N_1 video is of constant level, holding the base of transistor V20 at a constant potential.

The N_2 gate pulses from the gating circuitry pass through the meter integrator gate, V25, allowing the meter integrator, V24, to conduct. With N_1 video pulses equal to N_2 video pulses (corresponding to theoretically infinite noise figure) at the base of meter integrator V24, maximum conduction takes place in V24, allowing capacitor C34 to charge during the N_2 gate pulse. The discharge circuit for capacitor C34 is through resistors R64, R70 and R72. The resultant potential at the base of transistor V23 is such that no current flows through the meter M1, and the pointer rests at the right hand side indicating ∞ noise figure.

When video is applied to V24 and the height of the N_2 pulses is less than the height of the N_1 pulses (indicating a noise figure less than infinity), the increase in video tends to increase the charging current of capacitor C34 through V24. As a result, the discharge current of capacitor C34 starts to increase and the potential at the base of V23 tries to go positive, tending to increase the current through V23. This

effort to become positive is transmitted via common emitter resistor R65 to V20. This tries to decrease the current through V20 which tends to make the base of V21 more positive. This in turn reduces the current through V21 which instead is drawn through the meter. The increased meter current is drawn through resistor R70 which tends to nullify the tendency of the base of V23 to go positive. Thus the base of V23 is always held at a near-constant potential. If the current through resistor R70 tries to increase due to increased discharge current from capacitor C34 (caused by an improved noise figure), the current through R70 is replenished via the meter. The best noise figure condition charges C34 the most, creating the largest discharge current and calling for the maximum meter current of 100 microamperes.

3.9 ALARM CIRCUIT

The Alarm Circuit is shown in simplified schematic diagram fig 3-7 and in schematic diagram for the Plug-in Unit. When the collector of V21 goes positive to provide meter current, the positive excursion is coupled to the base of V14. This increases current flow in V14 and places a more negative potantial on the base of V12. The resultant collector current in V12 flows in the alarm relay, pulling in its contacts. This removes AC from the ALARM lamp and opens the external alarm indicating circuit. If the meter current decreases, indicating an increased noise figure, V12 current decreases, releasing the alarm relay and activating the alarm indications.

To provide for fluctuation in operating characteristics, V13 forms a differential amplifier with V14. The reference input to V14 is taken from the constant potential on the emitters of V20 and V23. Variable resistor R37 applies a portion of that potential to V14. The setting of R37 determines what meter current (and consequently what noise figure) will activate the alarm indications.

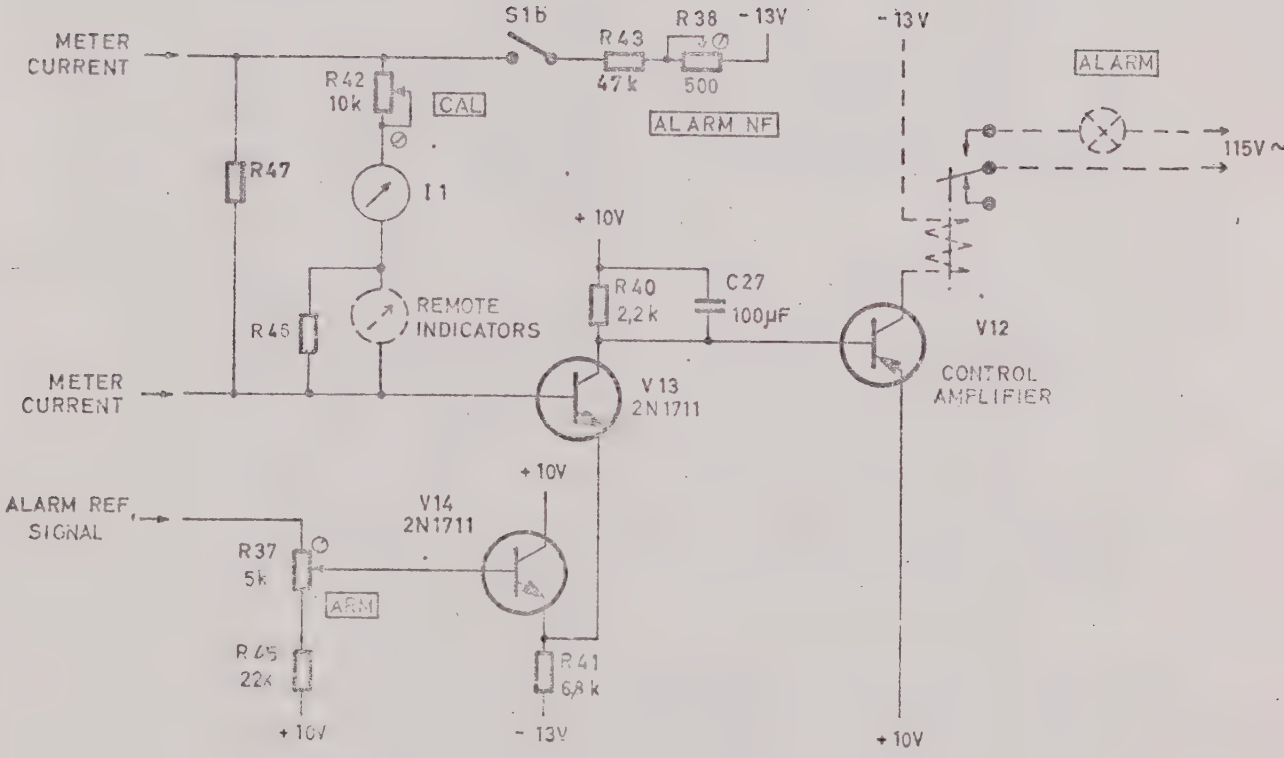


Figure 3-7. Alarm Circuit, Simplified Schematic Diagram

To set the alarm circuit to provide an alarm indication at a desired NF, ALARM NF control R38 provides a temporary current to the meter representative of the desired alarm-sounding NF. Then the ARM control R37 is adjusted to the point at which an indication is obtained.

3.10 POWER SUPPLY

The power supply is shown in block diagram in fig 3-8 and in schematic diagram for the Power Supply. Two supplies are included: a +10 V and a -13 V supply.

The rectifiers, filter condensers and regulator are mounted on the printed circuit board. The two regulators have exactly the same schematic diagram, so only the +10 V supply is described.

The regulator V3, which is an integrated circuit, samples a portion of the output. Any deviation from correct voltage is passed on to the control amplifier V2, which feeds the series regulator V1 and thus restoring the output to +10 V. In some versions of the noise figure meter the series regulator is mounted on the chassis in order to provide enough cooling for the transistor.

Should a short circuit occur across the output terminals the voltage drop across R4 will switch off the regulator to prevent damage. The regulator has a "fold back" characteristic, which means that when the current exceeds a certain value, it decreases to zero and stays there until the excessive demand, like a short, has disappeared.

The voltage is set with potentiometer P6.

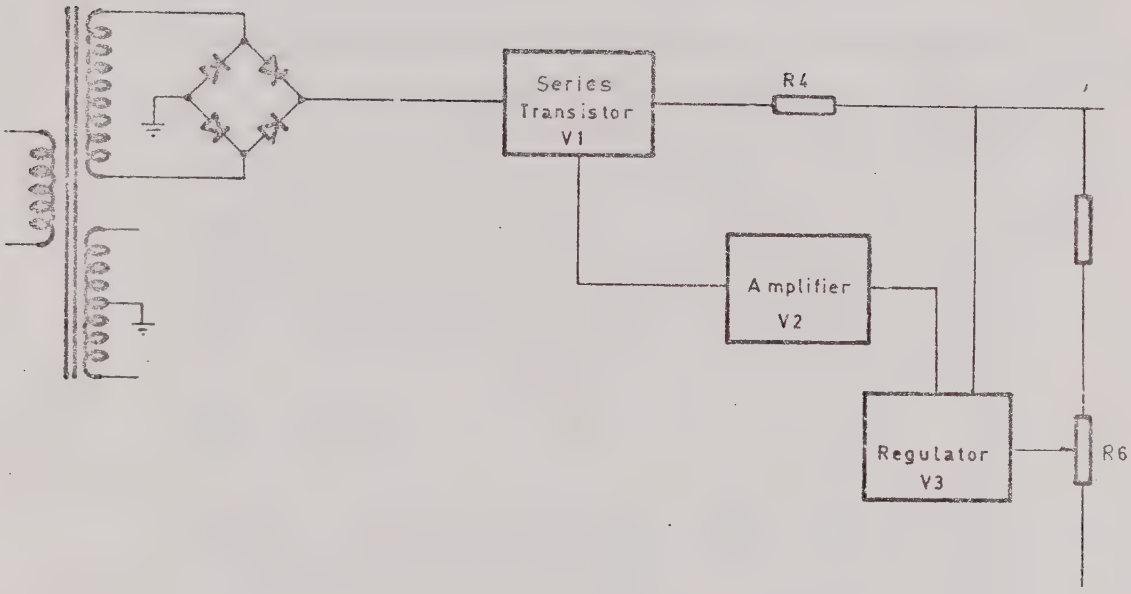


Fig 3 - 8 Power Supply, Block Diagram

3.11 MODULATOR (Noise Source)

Circuit Diagram see E-001414.

The modulator feeds the noise source with a pulse, which has a constant amplitude (+28 V). The DC voltage is generated by the diode bridge Z1 and the regulator is the integrated circuit V2, with a parallell transistor V1.

The pulsing is done by V3, which is connected in series with the noise source. The current path is via R10, V3 to R1. The modulator drive pulse is fed to the base of V3. This pulse, which is generated by the timing circuits in the noise figure meter, has a negative polarity. The current through the noise diode can be checked by connecting the input of an oscilloscope across R10. This current can vary from noise source to noise source.

3.12 NOISE SOURCE

Magnetic AB Model 126 System Noise Source consists of a semiconductor diode mounted in a coaxial transmission line. In order to achieve good measurement accuracy extreme care has been put into the design of the source. There are two basic types: Noise Sources with a waveguide output and sources with a coaxial output. In order to protect the noise diode from too high input powers (from the radar TX) the source has been provided with a ferrite isolator. The noise generating element is not replaceable. The excess noise has been set to 28 dB.

3.13 POWER MEASUREMENT

The power meter is used to measure power in the transmission line of a radar set. The measurement is done automatically and continuously when the radar transmitter is in operation. As the sensing elements are temperature compensated no repetitive zero setting is required.

3.14 OVERALL DESCRIPTION

This section of the instruction manual describes how the power meter makes the measurement of power. An overall description is given first and then each separate circuit of importance is described.

Figure 3-9 is a block diagram which shows the Power Meter and its associated thermistor mount. The thermistor mount contains two thermistor elements (R_d and R_c). Thermistor element R_d absorbs the rf power applied to the mount; thermistor element R_c converts the applied rf power to a meter indication and provides compensation for ambient temperature changes at the thermistor mount.

The power meter circuitry incorporates two bridges which are made self-balancing by means of separate feedback loops. Regenerative (positive) feedback is used in the detection loop; degenerative feedback in the metering loop. One thermistor element is used in one arm of each of the self-balancing bridges. In the detection loop, the 10 kc oscillator-amplifier supplies enough 10 kc power ($I_{10\ kc}$) to bias thermistor element R_d to the operating resistance which balances the rf bridge. The same amount of 10 kc power is also supplied to thermistor element R_c by the series-connected primaries of transformers T1 and T2.

When rf power is applied to thermistor element R_d, an amount of 10 kc power equal to the rf power is removed from thermistor element R_d by the self-balancing action of the rf bridge. Since the primaries of T1 and T2 are series-connected, the same amount of 10 kc power is also removed from thermistor element R_c, thus, the action which balances the rf bridge unbalances the metering bridge. The metering bridge loop automatically

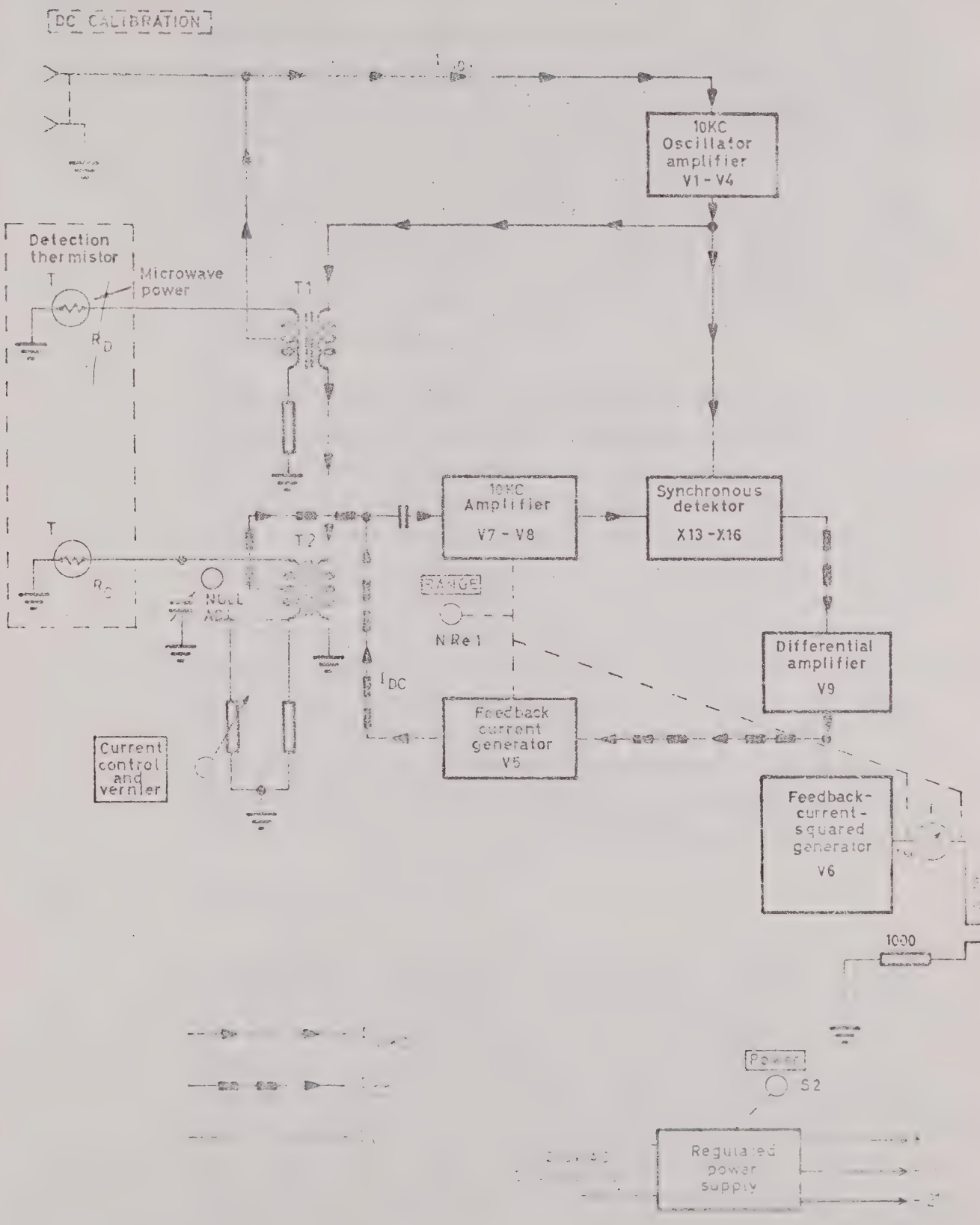


FIGURE 3.9 BLOCK DIAGRAM

re-balances by substituting dc power for 10 kc power. Since the 10 kc power equalled the applied rf power, the substituted dc power is also equal to the applied rf power. Instead of metering the feedback current directly, which would require the use of a nonlinear meter scale, an analog current is derived which is proportional to the square of the feedback. Since power is a square-law function of current, the analog current thus derived is proportional to rf power, making possible the use of a linear scale on the meter.

There is little drift of the power meter zero point when ambient temperature at the thermistor mount changes. If, for example, ambient temperature at the mount increases, a decrease in electrical power to the thermistors is required to hold their operating resistances constant. The decrease, for both thermistors, is made automatically by the detection loop (figure 3-9) which reduces 10 kc power. The amount of dc power in the metering loop remains unchanged however, and since this dc power controls the meter action, the ambient temperature changes does not affect the meter indication. The compensation capability depends upon the match of thermistor temperature characteristics. When thermistor mounts are built, the thermistors are selected to insure optimum match of thermal characteristics.

3.15 RF BRIDGE CIRCUIT

A simplified schematic diagram of the rf bridge circuit is shown in figure 3-10. The rf bridge circuit consists of the rf bridge and 10-kc oscillator-amplifier. The rf bridge includes thermistor R_a, the secondary winding of T1, resistors R1-R5 and capacitance represented by C_a and C_b. The rf bridge and 10 kc oscillator-amplifier are connected in a closed loop (the detection loop) which provides regenerative feedback for the oscillator-amplifier. This feedback causes the 10 kc oscillator-amplifier to oscillate.

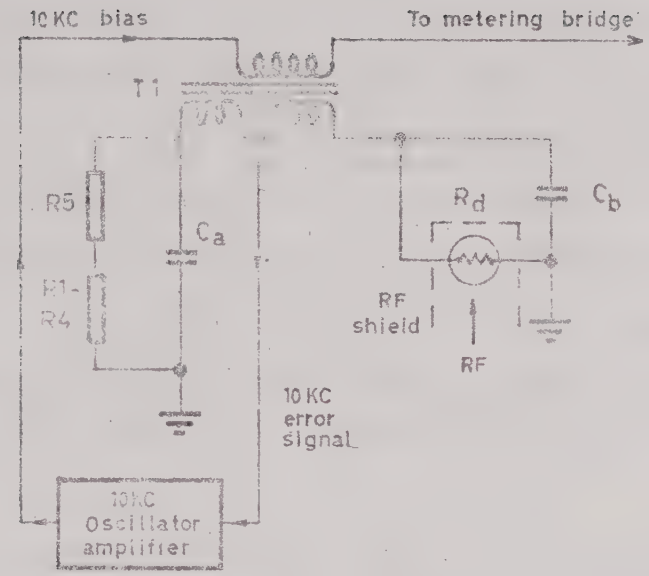


FIGURE 3.10 RF CIRCUIT

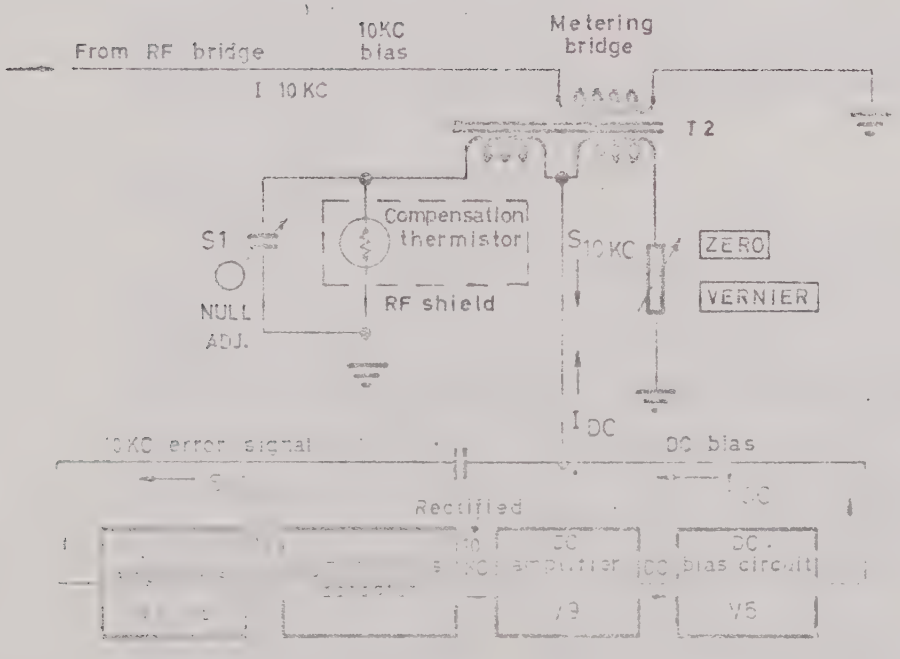


FIGURE 3.11 METERING BRIDGE CIRCUIT

When the power meter is off, thermistor R_d is at ambient temperature and its resistance is about 1500 ohms; the rf bridge is unbalanced. When the power meter is turned on this unbalance of the rf bridge causes a large error signal to be applied to the 10 kc oscillator-amplifier. Consequently maximum 10 kc bias voltage is applied to the rf bridge. As this 10 kc voltage biases R_d to its operating resistance (100 or 200 ohms) the rf bridge approaches a state of balance and regenerative feedback diminishes until there is just sufficient 10 kc bias power to hold R_d at operating resistance. This condition is equilibrium for the detection loop.

With application of rf power, thermistor R_d's resistance decreases causing the regenerative signal from the rf bridge to decrease. Accordingly, 10 kc power diminishes, the thermistor returns to operating resistance and the detection loop regains equilibrium.

Resistors R1-R4 are used to compensate for different lengths in the cable between mount and power meter input.

3.16 METERING BRIDGE CIRCUIT

A simplified schematic diagram of the metering bridge circuit is shown in figure 3-11. Operation of the metering bridge circuit is similar to the rf bridge circuit. It uses the same principle of self-balancing through a close loop (metering loop). The major difference is that dc rather than 10 kc power is used to rebalance the loop. The resistive balance point is adjusted by the ZERO COARSE and FINE controls which constitute one arm of the bridge.

The same 10 kc power change produced in the rf bridge by rf power also affects the metering bridge through the series connection of T1 and T2 primaries. Although this

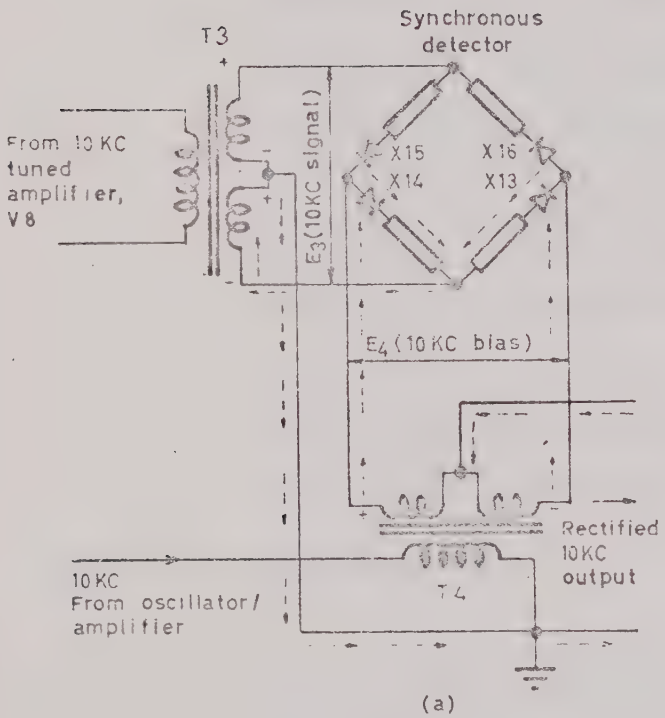
and metering bridges, it is initiated by the rf bridge circuit alone. The metering bridge cannot control 10-kc bias power, but the 10-kc bias power does affect the metering circuit. Once a change in the 10-kc bias power has affected (unbalances) the metering bridge, a separate, closed dc feedback loop (metering loop) re-establishes equilibrium in the metering circuit.

Variations in 10-kc bias level, initiated in the rf bridge circuit, cause proportional unbalance of the metering bridge and there is a change in the 10-kc error signal ($S_{10\ kc}$) applied to the 10-kc tuned amplifiers in the metering loop. These error signal variations are amplified by three 10-kc amplifiers, and rectified by the synchronous detector. From the synchronous detector the dc equivalent (I_{dc}) of the 10-kc signal is returned to the metering bridge, and is monitored by the metering circuit to be indicated by the meter. This dc feedback to the metering bridge acts to return bridge to its normal, near-balance condition.

The reactive components of the metering bridge are balanced with capacitors C1, C14 and C15.

3.17 SYNCHRONOUS DETECTOR

The synchronous detector converts the 10-kc error signal from the metering bridge to a varying dc signal. A simplified schematic of the synchronous detector is shown in figure 3-12. The detector is a bridge rectifier which has a rectifier in series with a linearizing resistance in each of its arms. Two 10-kc voltages, designated E3 and E4 in figure 3-12, are applied to the bridge; 1) voltage E3, induced in the secondary of transformer T3, is proportional to the metering-bridge error signal and is incoming from 10-kc tuned amplifier V8; 2) voltage E4, induced in the secondary of T4, is proportional to a voltage supplied



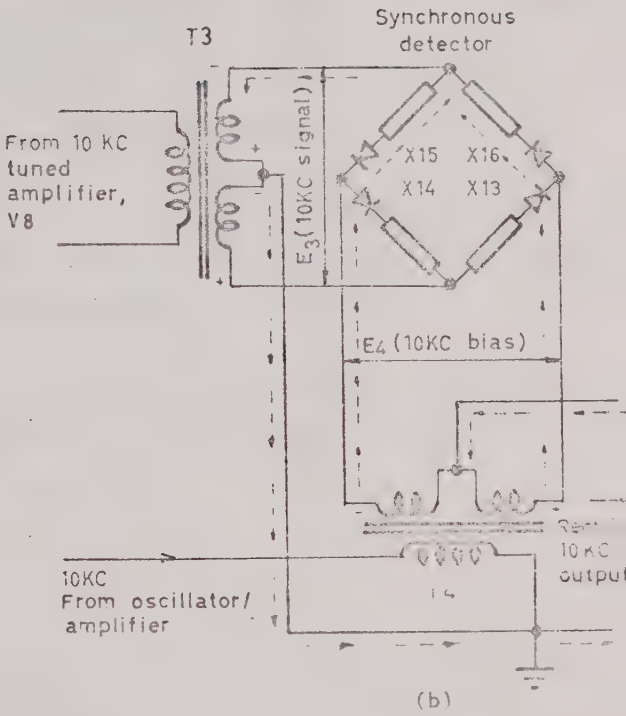


FIGURE 3.12 SYNCHRONOUS DETECTOR

by the 10-kc oscillator-amplifier. Voltage E4 is much larger than voltage E3 and switches appropriate diodes in and out of the circuit to rectify voltage E3. Section A of figure 3-12 shows the current path through diodes X14 and X13 for a positive-going signal; section B shows the current path through diodes Z15 and X16 for a negative-going signal. The rectified output is taken at the center taps of transformers T3 and T4.

Operation of the circuit is as follows: When the left side of T4 is positive with respect to the right side (see figure 3-12), diodes Z14 and X13 conduct while diodes X15 and X16 are biased off. With the polarities reversed (see figure 3-12), the diodes X14 and X13 are biased off. The resultant output is a pulsating dc signal equivalent to the applied 10-kc error signal. This pulsating dc signal is filtered and applied to amplifier V9.

Proper synchronous detector output requires an in phase relationship between E3 and E4 and for amplitude of E4 to be larger than that of E3.

3.18 AMPLIFIER V9

A simplified schematic diagram of the amplifier is shown in figure 3-13. The pulsating dc from the synchronous detector is filtered by C24, C25, C26 and R61, amplified by V9 (figure 3-14) and feedback current generator V5. Diode X18 protects V6 and V5 from excessive reverse bias when V9 is cut off.

3.19 FEEDBACK CURRENT GENERATOR V5

A simplified schematic diagram of the feedback current amplifier is shown in figure 3-14. The dc signal from

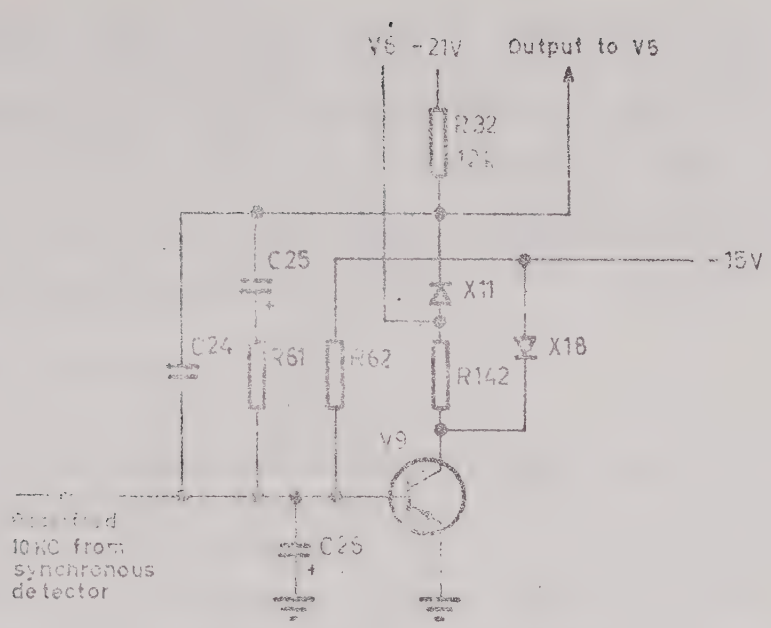


FIGURE 3.13 AMPLIFIER

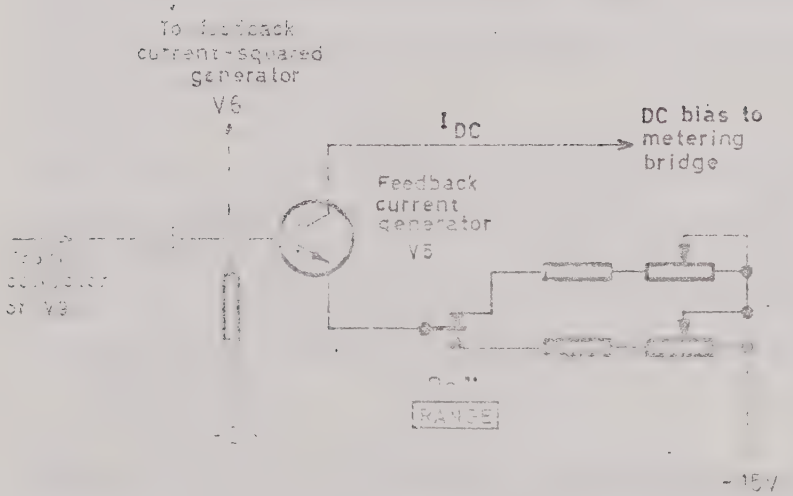


FIGURE 3.14 FEEDBACK CURRENT GENERATOR

the amplifier V9 is applied to feedback current generator V5. V5 has two functions: 1) it completes the metering loop to the metering bridge, and 2) it operates in conjunction with the range switch to change metering loop gain so that the meter will read full scale for each power range. Diode X11 provides additional temperature compensation for V5.

3.20 METER CIRCUIT

The meter circuit is shown in figure 3-15. It includes feedback current-squared generator V6, a squaring circuit, the meter, and RECORDER jack. The purpose of the meter circuit is to convert a linear voltage function, proportional to amplied power, to a squared function so that power may be indicated on a linear meter scale. The linear voltage function is applied to the base of V6 and is converted to a square law function by the squaring circuit in series with V6 emitter.

The squaring circuit includes diodes X4-X9 and resistors R19-30. Temperature compensation for the squaring circuit is provided by X3.

The design of the squaring circuit is such that individual diodes conduct at discrete values of emitter voltage so that emitter conductance approximates a square law function. Thus the collector current of V6 is made to approximate a square law function, and the meter indicates power on a linear scale.

ZEROING. Perfect balance of the metering bridge would mean that no 10 kc error signal would be applied to the 10 kc amplifiers, there would be no dc feedback from V5,

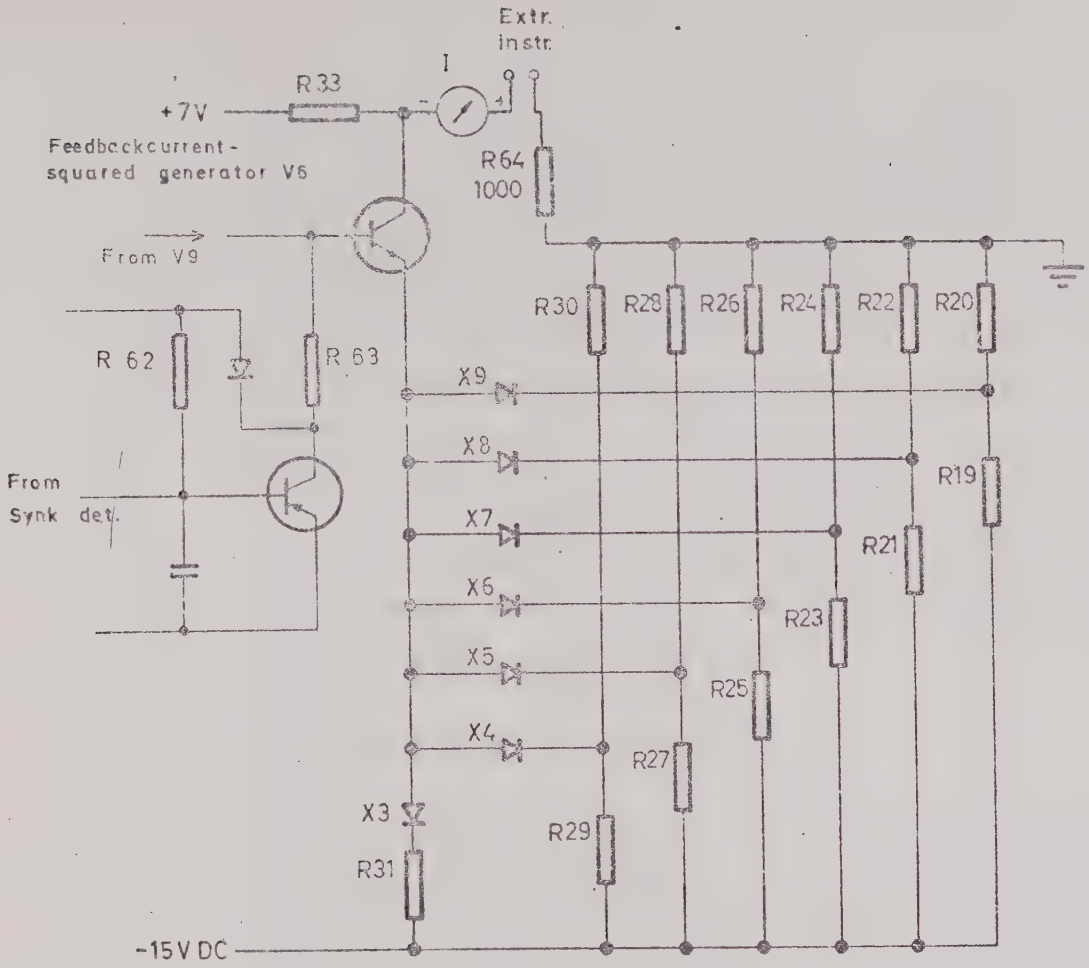


FIGURE 3.15 METER CIRCUIT

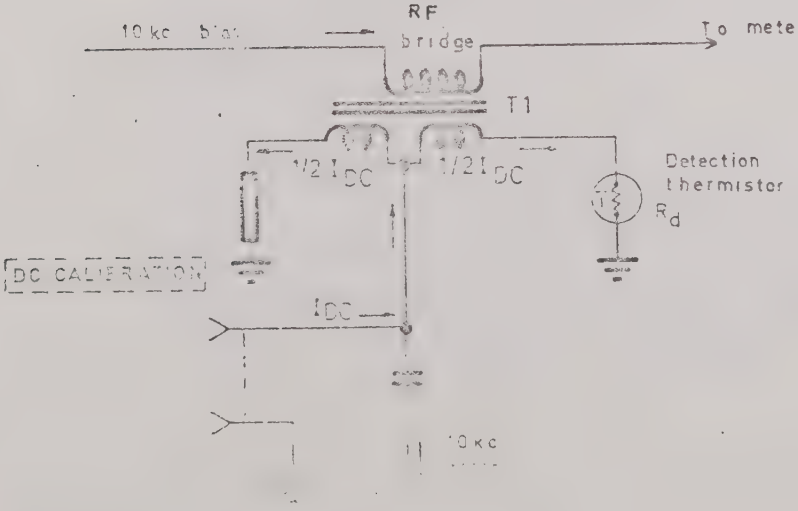


FIGURE 3.16 DC CALIBRATION AND SUBSTITUTION

and the metering loop would be open. With an open metering loop, zero reference could not be accurately established. In the Model 311 this occurence is prevented by insuring a closed metering loop even when the ZERO control causes the meter pointer to deflect downscale from zero. By the combined actions of R62 and R33, the zero setting of the meter pointer does not coincide with absolute balance of the metering bridge. A slight unbalance of the bridge is maintained by R62, while R33 provides a counter-action in the feedback current-squared generator, V6, so that the meter can indicate zero even though the metering bridge is not perfectly balanced. Resistor R33 also sets the full scale accuracy of the meter.

3.21 DC CALIBRATION

A simplified schematic diagram of the dc calibration circuit is shown in figure 3-16. Highly accurate rf power measurements can be made using the dc substitution technique. In the dc substitution method dc is used to duplicate the rf power reading. An accurate, known current (I_{dc}) is supplied externally at the DC CALIBRATION terminals. Calculation of the substituted dc power gives an accurate measure of the rf power. Effectively, dc power is substituted for rf power.

3.22 POWER SUPPLY

The printed circuit card has circuits for one regulated voltage, -15 V and two stabilized voltages, 6.3 and 24.4 volts. The last two with the same rectifier. The two stabilized voltages get their DC voltage from the diode bridge D4. Zener diode Z1 stabilizes the +7 V and diodes X2-X4 stabilize the -11 V.

The regulator for -15 V gets its DC voltage from the diode bridge Z3. The regulator consists of an integrated circuit V6, which is provided with a current limiting facility. Transistor V4 is used as the series element in the regulator and transistor V5 is a driver for the series transistor V4. The output voltage is set with potentiometer R16.

The error signal for the current limiting facility is taken across R14 and fed to the IC. The regulator has a "fold back" characteristic, which means that if the current exceed a certain value, it decreases to zero and stays there until the excessive demand, like a short, has disappreared.

3.23 ALARM CIRCUITS

The alarm circuits consist of transistors V10-V11 and relay Re2 (see circuit diagram). The alarm level is set with ALARM ARM (R11), which gives a bias voltage to V11. When V11's base voltage reaches the value when V11 conducts transistor V12 will also conduct and thereby actuate relay Re2. The error voltage to the alarm circuit is generated across resistor R64 in the meter circuit.

In order to make it possible to set the alarm level without the power meter having any input RF power, an artificial power reading may be set by pressing ALARM POWER on the main panel and setting the reading with potentiometer ALARM POWER. When ALARM POWER (S4) is pressed a current, which depends on the setting of R10, flows through R64. This causes a voltage drop across R64, which is sensed by the alarm circuits.

3.24 RF-HEAD

Magnetic AB Model 324 RF-head consists of a directional coupler. The coupler senses the power travelling in one direction in the main waveguide. Connected to the output of the secondary arm of the coupler is a thermistor mount. Between the directional coupler and the thermistor mount a calibration attenuator is mounted. This attenuator is used to set full scale deflection of the power meter.

The thermistor mount contains a pair of thermistors with equal temperature characteristics. The two thermistors are mounted in a common thermal environment, which makes changes in the ambient temperature have very little effect on power meter reading. One of the thermistors is mounted so that incident power reaches it. This thermistor is one arm of the RF-bridge of the power meter. The other thermistor is part of the metering bridge. The two bridges are self-balancing.

The two bridges are balanced before micro wave power is fed to the thermistor mount, whereby the two thermistors are heated to their operating resistance (100 ohms) by a 10 kHz current being fed through them. When incoming RF power reaches the RF thermistor the bridge becomes unbalanced and the 10 kHz current is automatically decreased till the bridge is returned to balance. The decrease of 10 kHz current in the metering bridge makes this bridge unbalanced and sufficient DC power is automatically fed to the bridge to keep it balanced. The DC current is generated in the metering circuits and is fed through the meter movement in the power meter. This DC current is proportional to the incident RF power to the thermistor mount.

For full scale [illegible] is

The calibration attenuator has a value of about 10 dB. The coupling of the directional coupler depends on the average power in the main waveguide. The total attenuation between the main waveguide and the thermistor mount shall equal the ratio between the maximum deflection of the power meter and 5 mW.

PART 4

SYSTEM INFORMATION

4.1 INTRODUCTION

This radar monitor is a combination of a noise figure meter and a power meter. The noise figure meter measures the noise figure of the radar receiver and the power meter the output power from the transmitter.

4.2 SYSTEM INFORMATION

Radar monitor 3011-11 is intended for a radar set using S-band waveguide which is pressurized.

The monitor has one channel for noise figure measurement (30 MHz) and one channel for power measurement.

A solid state noise generator is used as a noise generator. This generator is protected by a ferrite isolator and coupled to the transmission line by means of a 30 dB directional coupler.

The RF-head consists of a directional coupler with a thermistor mount for sensing the power level. The thermistor mount is preceeded by a power set attenuator.

The radar monitor is mounted in the radar cabinet. Connection is by means of two multipin and three coaxial connectors at the rear of the monitor chassis.

As the radar set can operate with two PRF:s the radar monitor is given a command signal at the highest PRF. This command signal changes the measurement time and the delay time in the monitor.

A block diagram of the system is shown on drawing E-3011015.

4.3 CABLES AND CONNECTORS

Drawing E-3011020 shows the external connections, which are required to operate the monitor.

PART 5 .

MAINTENANCE

5.1 PREVENTIVE MAINTENANCE

INTRODUCTION

The radar monitor is a complicated piece of equipment, but has been designed to require a minimum of maintenance. If the instructions below are followed the equipment will give reliable service.

It is assumed that the people performing the maintenance have experience from maintaining complicated electronic equipment.

Fault location in the field is done by signal tracing and exchange of exchangeable units.

Repair of plug-in units and printed circuit cards should only be done in a repair shop, which is adequately equipped for the operation, i.e. instruments and tools.

CLEANING

Chassis and units should be cleaned by means of a vacuum cleaner or a dry clean cloth. Compressed air should be avoided, since it will blow dirt into relay contacts. High voltage isolators should be cleaned with a linnen cloth, which has been moistened in carbontetrachloride. Front panels and printed circuits are cleaned with a soft brush or a piece of cloth, which has been moistened in alcohol.

Inspect the equipment at regular intervals for clean-

CABLES

Inspect multi-wire cables and coaxial cables for damaged isolation, which may cause future short circuits. Check that the coaxial cables are not loose in their clamps. Make immediate repairs.

RELAYS

Hermetic relays do not require any maintenance. Open relays require only a minimum of service, but should be checked for dirt. Use normal contact cleaning procedure should it be required.

CONNECTORS

All connectors should be checked for corrosion and that they are properly seated. Check that locking mechanisms are properly fastened.

5.2 FAULT FINDING AND TROUBLE LOCATION

INTRODUCTION

The first step is to perform the normal operating procedure and then check for some important wave forms in order to establish which unit that is faulty. There is no substitute for a good knowledge of the system.

Power Meter Channel

With the radar transmitter off check that channel can be set to zero. If a unit can not be set to zero, exchange it with another unit (switch off monitor while exchanging the units).

If it is still impossible to zero the unit, it is most probable the thermistor mount on the RF-head for this channel that is faulty.

If none of the power meter channels can be set to zero check all power supply voltages for the power meter channel , see paragr. e-g. below.

Start the radar transmitter. Check that the output power channel indicates normal power readings. If the channel does not make any deflection, replace it by another unit. Power indication after the change indicates a faulty unit.

If changing channels have no effect on the indication, exchange (switch off monitor while this is done) the RF-head thermistor mount. If the fault now "follows" the thermistor mount, the thermistor mount is faulty. (It is most probable that the directional coupler or the power set attenuator is faulty when it shows signs of damage).

Exchange the faulty unit and return it to the nearest repair station.

Noise Figure Channel

Depending on the operational status of the radar, the fault finding procedure may have to be somewhat altered. The instruction is based on normal operation with the trigger selector in EXT.

For normal fault finding the quickest way to find a faulty unit is to substitute it with a spare unit. For some of the tests below, it is recommended that the noise signal from the radar IF to the monitor is replaced by a 30 MHz CW signal, having a level of 25 mV. (If there is any doubt as to the level of the signal from the radar receiver.)

NOISE FIGURE METER READS INFINITY (when targets are received):

Check the noise source drive pulse from the NS MODULATOR. It shall be +28 V. If the pulse is missing check the NS Modulator drive pulse (neg. 10 V) at J10/18 on the chassis.

THE NOISE FIGURE PLUG-INS CAN NOT BE SET TO CAL OR INF:

Feed a 50 uV, 30 MHz CW signal to P5 on the monitor chassis. This signal shall be sufficient for setting INF and CAL.

VIDEO SIGNAL CHECK:

This is one of the most revealing tests for correct operation of the noise figure meter. This check will in one simple measurement indicate if: 1) the timing circuits work and are set for the correct timing. 2) the input signal is sufficient, 3) no interference signals are present.

Connect an oscilloscope to test point J in the noise figure plug-in. The pulse shall be a negative going pulse (amplitude approx 3 V) with a smooth noise on its negative top. When the monitor is measuring noise figure every second pulse shall be slightly lower in amplitude.

If the instructions above have not made it possible to locate a faulty unit or component the following general test should be made in order to check the power supplies and the timing circuits.

a. Set trigger selector in position EXTERNAL or INTERNAL if this is more convenient.

b. Connect the monitor to a VARIAC. This will make it possible to check the regulation of the power supplies. For the sake to simplicity it is suggested that the VARIAC is not used until it is required to check the regulation of the power supplies.

c. The voltage from the POWER METER POWER SUPPLY shall be -15 V. Check on pin 12 and ground (2) on the connectors for the power meter plug-ins.

d. The voltage from the NOISE FIGURE POWER SUPPLY is +10 V and -13 V. Check +10 V between pin 2 and ground (8) and -13 V between pin 1 and ground (8) on the connector for the Noise Figure Plug-ins.

e. Check that the -15 V voltage does not change more than ± 0.05 V for a ± 10% change in line voltage.

f. Check that the voltage is about -21 V from pin 15 to ground (2). (Power Meter Plug-in connector).

g. Check that the voltage is about +7 V from pin 17 to ground (2). (Power Meter Plug-in connector).

h. Check that the +10 V voltage does not change more than ± 0.05 V for a ± 10% change in line voltage. (Ripple less than 40 mV p-p).

i. Check that the -13 V voltage does not change more than ± 0.05 V for a ± 10% change in line voltage. (Ripple less than 40 mV p-p).

j. Check the following wave form (see Instruction Manual Fig. 3-2 and 3-3 in PART 3, CHAPTER 3.4. The numbers refer to pins in the Noise Figure Plug-in connector.

Gate pulse to tuned amplifier, pin 10
Gate pulse to meter integrator, pin 16
Gate pulse to ACC integrator, pin 13

Noise pulse to noise source. Check on output connector.

5.3 INSTRUMENT SYSTEM CHECK-OUT

In order to check the entire instrument system, proceed as follows:

The following instruments are required:

Multimeter	AVO 9
RF-generator	Newlett Packard 608 or equiv.
Pulse generator	Philips PM 5711 or equiv.
DC power supply	Oltronix D40-04D or equiv.
Oscilloscope	Advance 93 2100 or equiv.
Standard Noise Figure Meter	Magnetic AB 113, 117 or equiv.
Standard Power Meter	Magnetic AB 310 or equiv.

Electrical Test

The test set shall be checked with a mains voltage of 220 V ± 10%.

a. Set the panel switches to the following positions:

POWER to OFF (S1)
TRIGGER to EXT (S2 on rear of chassis)
FUNCTION SELECTOR to NOISE FIGURE

b. Make the required external connections.

c. Switch POWER to ON. The lamp, SL1, POWER shall light.

d. Switch FUNCTION SELECTOR to cal. The lamp SL3 shall light. Return switch to NOISE FIGURE.

e. Connect the oscilloscope, which is triggered by the RF generator to P3. A positive pulse with

f. Timing of the pulse in connector P3 should be:*)

Start of pulse (Delay from trigger) 2950 µs ± 10

Width of pulse 600 µs $^{+10}_{-0}$

Start of pulse and pulse width are adjustable.

g. Connect the oscilloscope to test point J (one side of resistor R39) in Noise Figure Plug-in unit. This is the video signal in the noise figure meter and should have an amplitude of about 5 V negative. Vary the IF input level from 20 uV to 0.1 V. Check that the amplitude remains constant (correct AGC action). Note that there is a time delay in the AGC action. The pulse width of this video pulse should be 600 µs $^{+10}_{-0}$

h. With the oscilloscope still connected to test point J (g.) switch the TRIGGER switch (on rear of chassis) from EXTernal to INTernal. The PRF of the video pulses should now be 500 Hz.

i. With the Meter Switch in position NOISE FIGURE adjust meter to ∞ and CAL with the FUNCTION SELECTOR and controls on the panel.

j. With the Meter Switch in position POWER check that the meter can be set to zero with the SET ZERO controls.

Functional Test

During the functional test the radar monitor is connected to a radar. Make the connections as shown on drawing E-3011015 or the equivalent HSA system drawing. Note that RF-head and Noise Source must be connected in the System. Follow the normal operating procedure of the Instruction [illegible].

*) At high PRF (command 24V on J1/5-6)
Start of puls (delay) 850µs ±5µs
Width of pulse 300µs $^{+10}_{-0}$ µs

a. Set TRIGGER Switch (rear of chassis) to EXTernal.

b. With the radar operating switch to POWER and read the power being transmitted. The difference between this measurement and a measurement with the standard power meter should be less than 15 per cent.

c. Switch to NOISE FIGURE. Read noise figure of the radar receiver. The difference between this measurement and a measurement with the standard noise figure meter should be less than 2 dB.

5.4 NOISE SOURCE MODULATOR MAINTENANCE

The 1149 Modulator is a fully transistorized instrument and under normal operating conditions it requires little or no maintenance. Before making any repairs or adjustments the information in the follcwing paragraphs must be considered.

Operational check

Whenever the modulator is suspected of faulty performance or a noise source is replaced, perform the following check:

1. Connect the noise source to the modulator and an oscilloscope between ground and pin 15 at connector J10.

2. For most systems noise sources the modulator will deliver about 10 mA peak current and a 28 V pulse should be seen on the oscilloscope connected between J10/15 and ground. This voltage may be set with potentiometer R6.

   The current may be checked by measuring the voltage pulse from J10/17 to ground. Disconnect the noise source and establish the residual circuit current. Then connect the noise source and read the difference in current (10 mA = 0.1 V).

5.5 RF-HEAD MAINTENANCE

The RF-head requires a minimum of maintenance and during field conditions very little can be done. The coupling of the directional coupler does not change unless the RF-head has been physically damaged. The calibration attenuator is more vulnerable to damage and should therefore be checked.

Therefore check the attenuation from the main waveguide to the input of the thermistor mount.

$$\text{Attenuation} = 10 \log \frac{\text{Full scale meter deflection}}{\text{Max power into thermistor}} \quad \text{dB}$$

The max. power into the output power thermistor is 5 mW. The power into the reflected power thermistor is 0.5 or 1.0 mW, depending on the ratio between the output and reflected power meter scales. (For a ratio of 10 the power is 0.5 mW).

If it is impossible to zero the power meter the match between the thermistors in the mount shall be checked. This can be done by comparing the thermistor resistances under simulated operating conditions. In order to check the thermistors connect one of the thermistors in series with a resistor of 2.7 kohm to a DC voltage of 30 V. The voltage across the thermistor, which is about 1.2 V, shall be measured with a digital voltmeter. The measurement is then repeated for the other thermistor in the mount. The thermistor match is satisfactory if the difference in voltage reading between the two thermistors is less than 15 mV. Non operating mounts with differences in voltage drop as high as 75 mV can probably be repaired.

If the difference is more than 15 mV the mount should be returned to the manufacturer for repair urless the user has facilities for thermistor mount repair. If the measure-

Note:

L-band RF heads (or special versions of the power meter), are using coaxial thermistor mounts with an operating impedance of 200 ohms.

When testing coaxial thermistor mounts for L-band RF-heads the voltage drop across the thermistor will be about 2.2 V in the above mentioned test. The difference in voltage drop between the thermistors should not be more than 30 mV. Mounts with differences up to 150 mV can be repaired.

PART 6

INSTALLATION

6.1 INTRODUCTION

General

Before starting the installation, make sure that the system is fully understood.

A description of the monitor and its interconnection with the radar can be found in PART 4, SYSTEM INFORMATION of this Instruction Manual for Radar Monitor 3011-II. All drawings and diagrams required for the installation and setting-up of the radar monitor can be found in PART 7 of this Instruction Manual.

Mechanical Inspection

Unpack the instrument and waveguide components upon receipt and inspect for signs of physical damage such as scratched panel surfaces, broken knobs, bent waveguide flanges or connectors, etc. If there is any apparent damage, file a claim with the carrier.

6.2 MECHANICAL ASSEMBLY

Cables and Connectors

The recommended cables and connectors are shown on page 4-2 of PART 4, SYSTEM INFORMATION.

The required interconnections are shown on drawing E-3011015, Interface, Monitor to Radar.

The cables recommended for the thermistor mounts (RF-head) must be used as the compensation of the power meter bridge has been designed for use with this cable. The radar monitor is adjusted for a cable length of 10 meters between the RF-head and the monitor unit. (10 m RG-174/U). For other cable lengths, adjust the cable by making it into a loop. No cutting is therefore necessary.

Waveguide Components

RF-Head Model L324-3

The RF-head may be mounted in any convenient part of the waveguide run between the duplexer and the antenna. See drawing E-3011015 in PART 7.

The coaxial output is intended for connection of a spectrum analyzer.

During installation make sure that the thermistor mounts are connected to the correct channels in the power meter.

WARNING! Check that the power line to the power meter is switched off when the thermistor mount is connected to its cable. When the power meter does not have any mount connected, the bridge has full voltage which may damage the thermistors if they are being connected.

Noise Injection Unit L150-2

The noise injection unit should be connected between the receiver and the antenna. The noise injection unit is delivered as a part of the radar, therefore check the radar's installation instructions.

Electronic Units

Radar Monitor Model 3011-11

Mount the monitor unit in the appropriate position in the equipment. See drawing E-3011015 for mounting hole dimensions.

Make the necessary connections as shown on drawing E-3011020.

6.3 ELECTRICAL SETTING-UP

Introduction

Operation of the radar monitor is described in PART 3, OPERATION of this Instruction Manual.

The monitor is a combination of two instruments, i.e. Noise Figure Meter Channel and Power Meter Channel. The Theory of Operation can be found in PART 1, CHAPTER 1.2.

Initial Setting-up

When all cables have been connected and checked for continuity, check of the timing wave forms should be performed:

a. Switch the Radar Monitor Trigger Selector to position EXT.

b. Disconnect P3 to Noise Source and connect an oscilloscope to P3. Switch on the radar monitor to measure noise figure.

c. Switch radar to LOW PRF

The cables recommended for the thermistor mounts (RF-head) must be used as the compensation of the power meter bridge has been designed for use with this cable. The radar monitor is adjusted for a cable length of 10 meters between the RF-head and the monitor unit. (10 m RG-174/U). For other cable lengths, adjust the cable by making it into a loop. No cutting is therefore necessary.

Waveguide Components

RF-Head Model L324-3

The RF-head may be mounted in any convenient part of the waveguide run between the duplexer and the antenna. See drawing E-3011015 in PART 7.

The coaxial output is intended for connection of a spectrum analyzer.

During installation make sure that the thermistor mounts are connected to the correct channels in the power meter.

WARNING! Check that the power line to the power meter is switched off when the thermistor mount is connected to its cable. When the power meter does not have any mount connected, the bridge has full voltage which may damage the thermistors if they are being connected.

Noise Injection Unit L150-2

The noise injection unit should be connected between the receiver and the antenna. The noise injection unit is delivered as a part of the radar, therefore check the radar's installation instructions.

Electronic Units

Radar Monitor Model 3011-11

Mount the monitor unit in the appropriate position in the equipment. See drawing E-3011015 for mounting hole dimensions.

Make the necessary connections as shown on drawing E-3011020.

6.3 ELECTRICAL SETTING-UP

Introduction

Operation of the radar monitor is described in PART 3, OPERATION of this Instruction Manual.

The monitor is a combination of two instruments, i.e. Noise Figure Meter Channel and Power Meter Channel. The Theory of Operation can be found in PART 1, CHAPTER 1.2.

Initial Setting-up

When all cables have been connected and checked for continuity, check of the timing wave forms should be performed:

a. Switch the Radar Monitor Trigger Selector to position EXT.

b. Disconnect P3 to Noise Source and connect an oscilloscope to P3. Switch on the radar monitor to measure noise figure.

c. Switch radar to LOW PRF

d. Trigger the oscilloscope from the radar trigger (same as the trigger input to the radar monitor).

e. Check that the delay between the trigger and the start of the modulator pulse is 2950 µs. The delay can be changed with potentiometer R 9 on the PULSE UNIT. This potentiometer is available from the top of the monitor chassis.

f. Check that the Noise Source Pulse is 600 µs. The length of this pulse can be set with potentiometer R12 on the PULSE UNIT. This potentiometer is available from the top of the monitor chassis.

g. Make sure that the transmitter pulse of the next period does not occur during the modulator pulse. See fig. 3-3, Timing Diagram, in the Instruction Manual for the Noise Figure Meter Channel, which is included in PART 3, CHAPTER 3.4 of this Instruction Manual.

Should adjustment be required, decrease the DELAY with R 9 as mentioned under d. above.

h. Switch radar to HIGH PRF.

i. Repeat (e), check delay to be 850 µs adjust with R14.

j. Repeat (f), check pulse to be 300 µs adjust with R15.

k. Connect P3 to the noise source.

l. Set Trigger Selector to EXT.

m. Now follow the Operating Procedure in PART 2, OPERATION of this Instruction Manual.

The Radar Monitor should now be ready for operational use.

LIST OF ILLUSTRATIONS

NOISE FIGURE MEASURING UNIT 1141C-0 (Noise)

Circuit Diagram	E-114513
Wiring Diagram	E-114498
Component layout	E-114499
Component Layout, IF amplifier	E-114174

POWER METER UNIT 3111C-1 (Power)

Circuit Diagram	E-311151
Component Layout	E-311144
Wiring Diagram	E-311145

POWER SUPPLY +10/-13 V (NFM)

Circuit Diagram	E-001429
Component Layout	E-001430

POWER SUPPLY (PM) AND NOISE SOURCE MODULATOR 1149

Circuit Diagram	E-001414
Component Layout	E-001413

PULSE UNIT

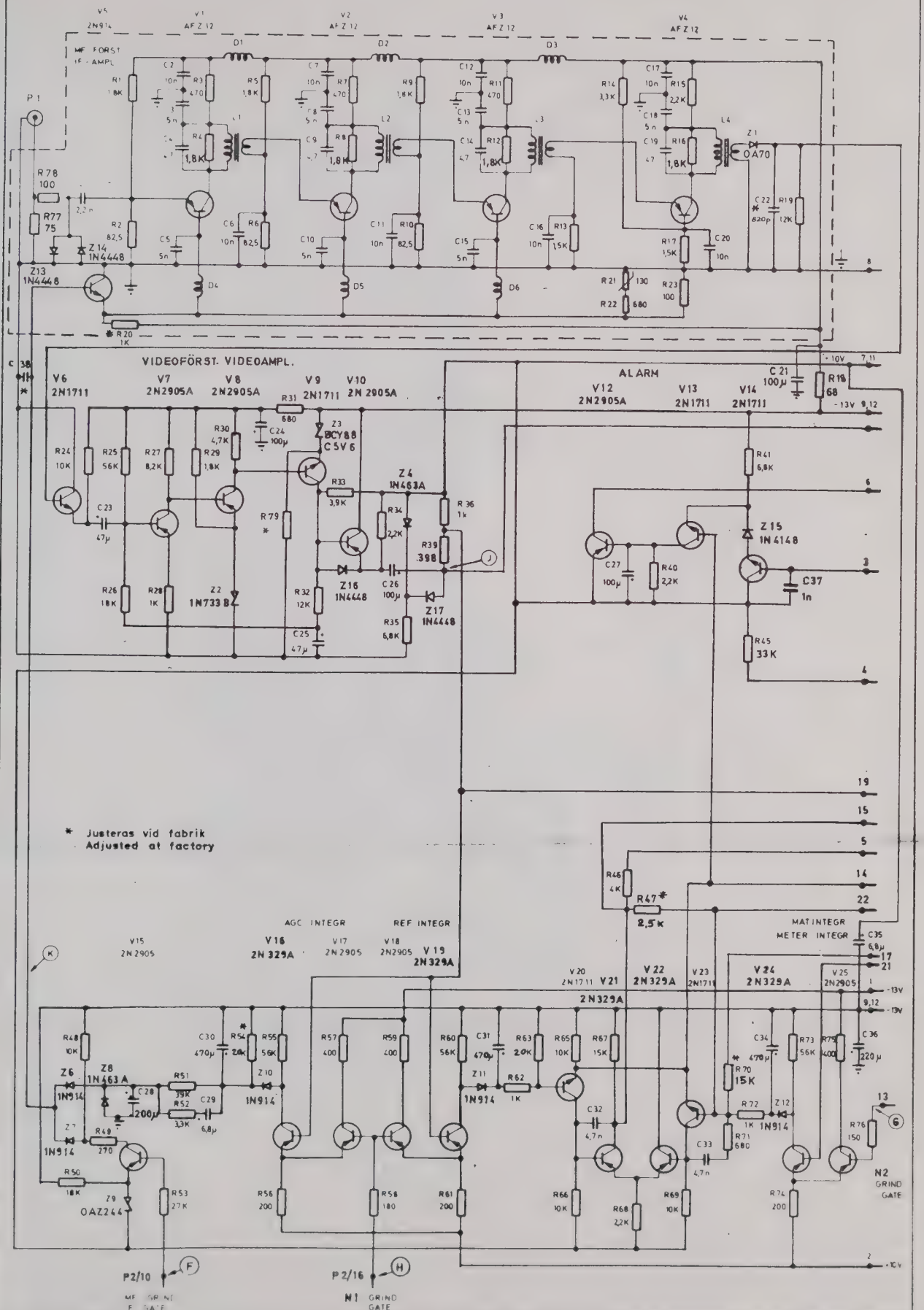
Circuit Diagram	E-001419
Component Layout	E-001422

RADAR MONITOR MODEL 3011-

Wiring Diagram	E-3011019
External Connections	E-3011020
Interface Radar Monitor to Transceiver	E-3011015
Transformer Primary Wiring Diagram	E-9155

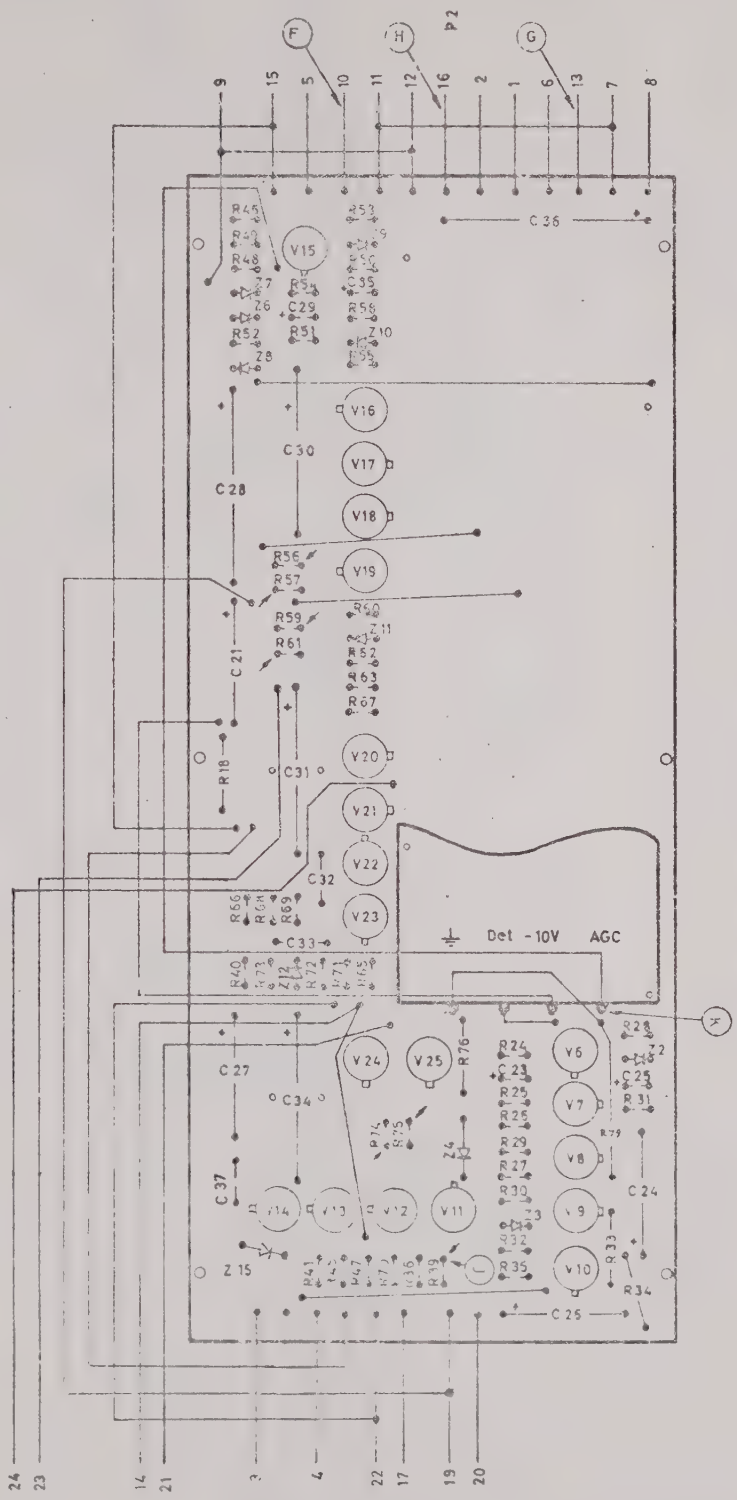
RF-HEAD MODEL 1324-3

Circuit Diagram	E-324051
Layout	E-324048



	R O			
MAGNETIC AB SWEDEN	INSTICKSENHET 1141C-6	PLUG IN UNIT 1141C-6		730328
				E - 114 513

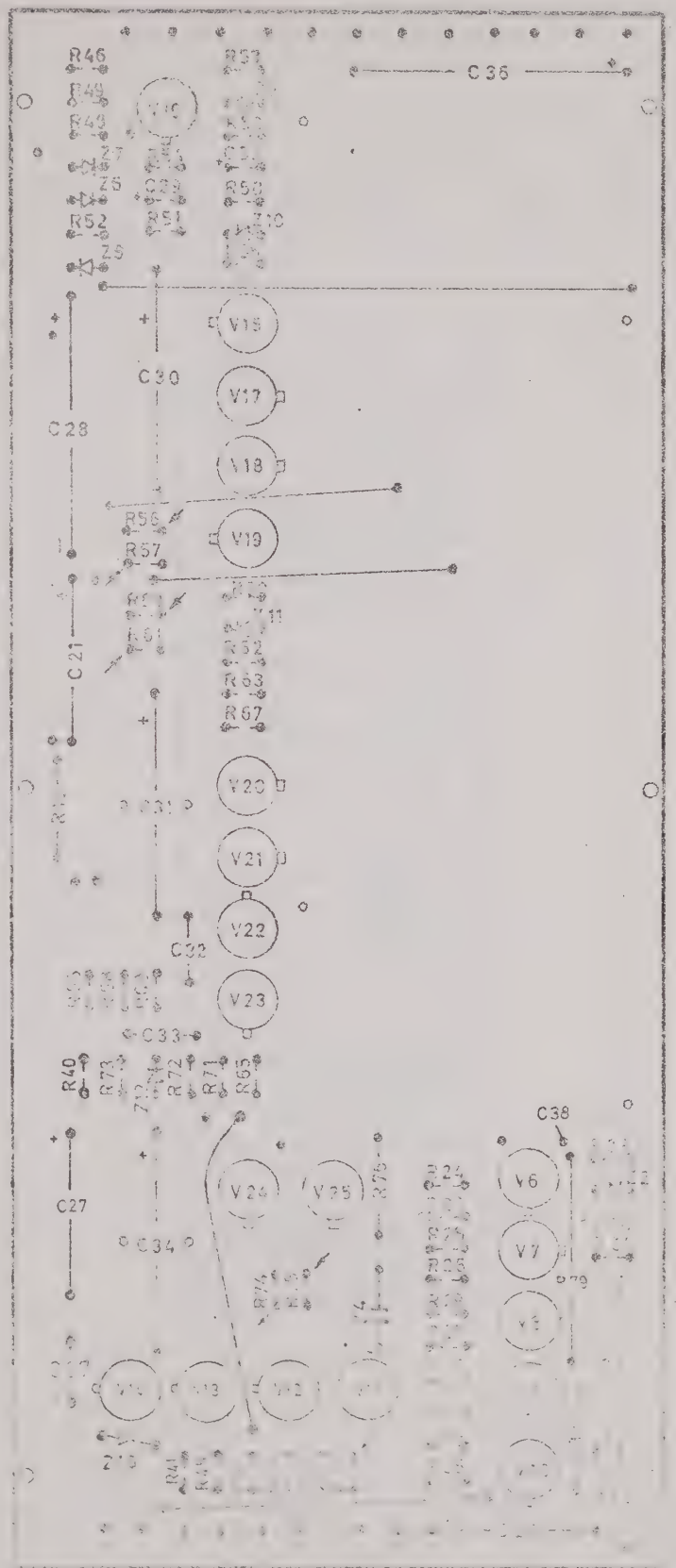
Denna ritning är vår egendom och skyddad enligt gällande lag samt får ej utan vårt medgivande kopieras, delgivas annan eller obehörigen användas.



⏚ LODÖRA PÅ IN- OCH UTSIDA AV MF-FÖRSTÄRKARE

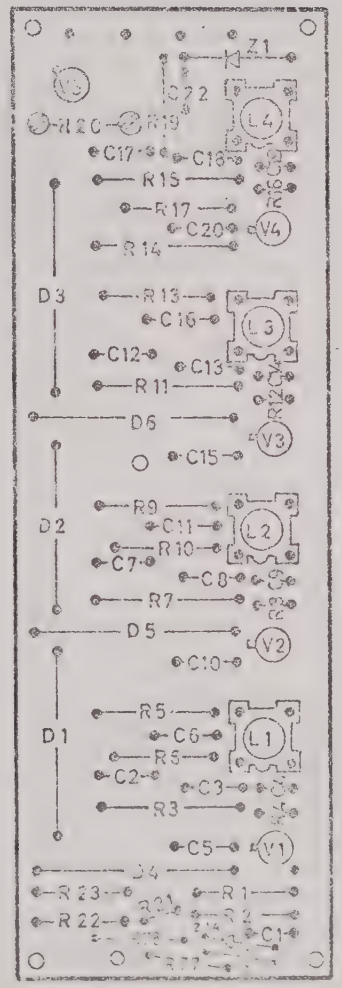
DET FÖRBINDNINGEN TILL LT-KORTET FÅR EJ LIGGA I STAMMEN SKALL GÅ KORTASTE VÄGEN

Marconi AB SVERIGE	TILLVERKNINGSBESKRIVNING	PLUG-IN UNIT 141C	E-114498
		WIRING DIAGRAM	


R46
R48
R49
Z7
Z8
R52
Z9
R53
R50
Z10
R51
C36
V16
C30
C28
C21
V15
V17
V18
V19
R56
R57
R61
R62
R63
R67
Y11
V20
V21
V22
V23
C32
C33
R40
R73
R72
R71
R65
C27
C34
V24
V25
R24
R25
V6
V7
C38
V1
V2
V3
V4
Z13
R41
R42
C31 och C34
lindes fast
Matpunkt
åtkomlig från
kompressorn

E-114 489

29 MAJ 1931 § 3.



75 0117

E-114 174

Insticksenhet 1141C-6

Plug-in Unit 1141C-6

MAGNETIC AB

Pos. Nr Pos. No	Komponentbeskrivning Description	Värde Value	Effekt Arb. sp. Rating	Tolerans Tolerance	Tillverkare Manufacturer	Typ Nr Part No.
R 1	Motstånd Resistor	1,8 kohm	0,25 W	1%	Vitrohm	MEA-T0
R 2	Motstånd Resistor	82,5 ohm	0,25 W	1%	Vitrohm	MEA-T0
R 3	Motstånd Resistor	470 ohm	0,5 W	5%	Vitrohm	104-0
R 4	Motstånd Resistor	1,8 kohm	0,5 W	5%	Vitrohm	104-0
R 5	Motstånd Resistor	1,8 kohm	0,25 W	1%	Vitrohm	MEA-T0
R 6	Motstånd Resistor	82,5 ohm	0,25 W	1%	Vitrohm	MEA-T0
R 7	Motstånd Resistor	470 ohm	0,5 W	5%	Vitrohm	104-0
R 8	Motstånd Resistor	1,8 kohm	0,5 W	5%	Vitrohm	104-0
R 9	Motstånd Resistor	1,8 kohm	0,25 W	1%	Vitrohm	MEA-T0
R 1	Motstånd Resistor	82,5 ohm	0,25 W	1%	Vitrohm	MEA-T0
R 1	Motstånd Resistor	470 ohm	0,5 W	5%	Vitrohm	104-0

E-114513 1141

MAGNETIC AB

Pos. Nr Pos. No.	Komponentbeskrivning Description	Värde Value	Effekt Arb.sp. Rating	Tolerans Tolerance	Tillverkare Manufacturer	Typ Nr Part No.
R 12	Motstånd Resistor	1,8 kohm	0,5 W	5%	Vitrohm	104-0
R 13	Motstånd Resistor	1,5 kohm	0,5 W	5%	Vitrohm	104-0
R 14	Motstånd Resistor	3,3 kohm	0,5 W	5%	Vitrohm	104-0
R 15	Motstånd Resistor	2,2 kohm	0,5 W	5%	Vitrohm	104-0
R 16	Motstånd Resistor	1,8 kohm	0,5 W	5%	Vitrohm	104-0
R 17	Motstånd Resistor	1,5 kohm	0,5 W	5%	Vitrohm	104-0
R 18	Motstånd Resistor	68 ohm	0,5 W	5%	Vitrohm	104-0
R 19	Motstånd Resistor	12 kohm	0,5 W	5%	Vitrohm	104-0
R 20	Motstånd Resistor	1 kohm	0,25 W	1%	Vitrohm	MEA-T0
R 21	Motstånd, termistor Resistor, termistor	130 ohm	0,5 W	20%	Philips	2322.610.11131
R 22	Motstånd Resistor	680 ohm	0,5 W	5%	Vitrohm	104-0

MAGNETIC AB

Pos. Nr Pos. No.	Komponentbeskrivning Description	Värde Value	Effekt Arb. sp. Rating	Tolerans Tolerance	Tillverkare Manufacturer	Typ Nr Part No.
R 23	Motstånd Resistor	100 ohm	0,5 W	5%	Vitrohm	104-0
R 24	Motstånd Resistor	10 kohm	0,5 W	5%	Vitrohm	104-0
R 25	Motstånd Resistor	56 kohm	0,5 W	5%	Vitrohm	104-0
R 26	Motstånd Resistor	18 kohm	0,5 W	5%	Vitrohm	104-0
R 27	Motstånd Resistor	8,2 kohm	0,5 W	5%	Vitrohm	104-0
R 28	Motstånd Resistor	1 kohm	0,5 W	5%	Vitrohm	104-0
R 29	Motstånd Resistor	1,8 kohm	0,5 W	5%	Vitrohm	104-0
R 30	Motstånd Resistor	4,7 kohm	0,5 W	5%	Vitrohm	104-0
R 31	Motstånd Resistor	680 ohm	0,5 W	5%	Vitrohm	104-0
R 32	Motstånd Resistor	12 kohm	0,5 W	5%	Vitrohm	104-0
R 33	Motstånd Resistor	3,9 kohm	0,5 W	5%	Vitrohm	104-0
R 34	Motstånd Resistor	2,2 kohm	0,5 W	5%	Vitrohm	104-0

Pos. Nr Pos. No.	Komponentbeskrivning Description	Värde Value	Effekt Arb. sp. Rating	Tolerans Tolerance	Tillverkare Manufacturer	Typ Nr Part No.
R 35	Motstånd Resistor	6,8 kohm	0,5 W	5%	Vitrohm	104-0
R 36	Motstånd Resistor	1 kohm	0,25 W	1%	Vitrohm	MEA-T0
R 37						
R 38						
R 39	Motstånd Resistor	398 ohm	0,25 W	1%	Vitrohm	MEA-T0
R 40	Motstånd Resistor	2,2 kohm	0,5 W	5%	Vitrohm	104-0
R 41	Motstånd Resistor	6,8 kohm	0,5 W	5%	Vitrohm	104-0
R 42						
R 43						
R 44						
R 45	Motstånd Resistor	33 kohm	0,25 W	1%	Vitrohm	MEA-T0
R 46	Motstånd Resistor	4 ohm	0,25 W	1%	Vitrohm	MEA-T0

Pos. Nr Pos. No.	Komponentbeskrivning Description	Värde Value	Effekt Arb. sp. Rating	Tolerans Tolerance	Tillverkare Manufacturer	Typ Nr Part No.
R 47	Motstånd Resistor	2,5 kohm	0,25 W	1%	Vitrohm	MEA-TO
R 48	Motstånd Resistor	10 kohm	0,5 W	5%	Vitrohm	104-0
R 49	Motstånd Resistor	270 ohm	0,5 W	5%	Vitrohm	104-0
R 50	Motstånd Resistor	18 kohm	0,5 W	5%	Vitrohm	104-0
R 51	Motstånd Resistor	39 kohm	0,5 W	5%	Vitrohm	104-0
R 52	Motstånd Resistor	3,3 kohm	0,5 W	5%	Vitrohm	104-0
R 53	Motstånd Resistor	27 kohm	0,5 W	5%	Vitrohm	104-0
R 54	Motstånd Resistor	20 kohm	0,25 W	1%	Vitrohm	MEA-TO
R 55	Motstånd Resistor	56 kohm	0,5 W	5%	Vitrohm	104-0
R 56	Motstånd Resistor	200 ohm	1 W	1%	Vitrohm	MEC-TO
R 57	Motstånd Resistor	400 ohm	1 W	1%	Vitrohm	MEC-TO
R 58	Motstånd Resistor	180 ohm	0,5 W	5%	Vitrohm	104-0

Pos. Nr Pos. No.	Komponentbeskrivning Description	Värde Value	Effekt Arb. sp. Rating	Tolerans Tolerance	Tillverkare Manufacturer	Typ Nr Part No.
R 59	Motstånd Resistor	400 ohm	1 W	1%	Vitrohm	MEC-TO
R 60	Motstånd Resistor	56 kohm	0,5 W	5%	Vitrohm	104-0
R 61	Motstånd Resistor	200 ohm	1 W	1%	Vitrohm	MEC-TO
R 62	Motstånd Resistor	1 kohm	0,5 W	5%	Vitrohm	104-0
R 63	Motstånd Resistor	20 kohm	0,25 W	1%	Vitrohm	MEA-TO
R 64						
R 65	Motstånd Resistor	10 kohm	0,5 W	5%	Vitrohm	104-0
R 66	Motstånd Resistor	10 kohm	0,5 W	5%	Vitrohm	104-0
R 67	Motstånd Resistor	15 kohm	0,5 W	5%	Vitrohm	104-0
R 68	Motstånd Resistor	2,2 kohm	0,5 W	5%	Vitrohm	104-0
R 69	Motstånd Resistor	10 kohm	0,5 W	5%	Vitrohm	104-0
R 70	Motstånd Resistor	15 kohm	0,25 W	1%	Vitrohm	MEA-TO
R 71	Motstånd Resistor	680 ohm	0,5 W	5%	Vitrohm	104-0

Pos. Nr Pos. No.	Komponentbeskrivning Description	Värde Value	Effekt Arb. sp. Rating	Tolerans Tolerance	Tillverkare Manufacturer	Typ Nr Part No.
R 12	Motstånd Resistor	1 kohm	0,5 W	5%	Vitrohm	104-0
R 13	Motstånd Resistor	56 kohm	0,5 W	5%	Vitrohm	104-0
R [illegible]	Motstånd Resistor	200 ohm	1 W	1%	Vitrohm	MEC-T0
R [illegible]	Motstånd Resistor	400 ohm	1 W	1%	Vitrohm	MEC-T0
R [illegible]	Motstånd Resistor	150 ohm	0,5 W	5%	Vitrohm	104-0
R [illegible]	Motstånd Resistor	75 ohm	0,25 W	5%	Vitrohm	100-0
R [illegible]	Motstånd Resistor	100 ohm	0.25 W	5%	Vitrohm	100-0
R [illegible]	Motstånd Resistor	2,2-10 k	0,5 W	5%	Vitrohm	104-0

MAGNETIC AB

Nr No	Komponentbeskrivning Description	Värde Value	Effekt Arb.sp. Rating	Tolerans Tolerance	Tillverkare Manufacturer	Typ Nr Part No.
1	Kondensator,ker. Capacitor,cer.	2,2 nF	500V		Philips	2222 630 01228
2	Kondensator,ker. Capacitor,cer.	10 nF	350V		Erie	811
3	Kondensator,ker. Capacitor,cer.	4,7 nF	500V		Erie	811
4	Kondensator,ker. Capacitor,cer.	4,7 pF	500V		Erie	831
5	Kondensator,ker. Capacitor,cer.	4,7 nF	500V		Erie	811
6	Kondensator,ker. Capacitor,cer.	10 nF	350V		Erie	811
7	Kondensator,ker. Capacitor,cer.	10 nF	350V		Erie	811
8	Kondensator,ker. Capacitor,cer.	4,7 nF	500V		Erie	811
9	Kondensator,ker. Capacitor,cer.	4,7 pF	500V		Erie	831
10	Kondensator,ker. Capacitor,cer.	4,7 nF	500V		Erie	811

Pos. Nr Pos. No.	Komponentbeskrivning Description	Värde Value	Effekt Arb. sp. Rating	Tolerans Tolerance	Tillverkare Manufacturer	Typ Nr Part No.
C 11	Kondensator,ker. Capacitor,cer.	10 nF	350V		Erie	811
C 12	Kondensator,ker. Capacitor,cer.	10 nF	350V		Erie	811
C 13	Kondensator,ker. Capacitor,cer.	4,7 nF	500V		Erie	811
C 14	Kondensator,ker. Capacitor,cer.	4,7 pF	500V		Erie	831
C 15	Kondensator,ker. Capacitor,cer.	4,7 nF	500V		Erie	811
C 16	Kondensator,ker. Capacitor,cer.	10 nF	350V		Erie	811
C 17	Kondensator,ker. Capacitor,cer.	10 nF	350V		Erie	811
C 18	Kondensator ker. Capacitor, cer.	4,7 nF	500V		Erie	811
C 19	Kondensator,styrol Capacitor,styrol	47 pF	500V		Ruwel	
C 20	Kondensator,ker. Capacitor,cer.	10 nF	350V		Erie	811
C 21	Kondensator,elyt Capacitor,elyt	100 µF	16V		Rifa	PEG 112 GE 310

Pos. Nr Pos. No.	Komponentbeskrivning Description	Värde Value	Effekt Arb. sp. Rating	Tolerans Tolerance	Tillverkare Manufacturer	Typ Nr Part No.
C 22	Kondensator, glimmer Capacitor, mica	1 nF	100V	10%	Philips	2222 630 01102
C 23	Kondensator, tantal Capacitor, tantal	47 µF	6V	20%	Texas Instrum.	SCM
C 24	Kondensator, elyt Capacitor, elyt	100 µF	16V		Rifa	PEG 112 GE310
C 25	Kondensator, tantal Capacitor, tantal	47 µF	6V	20%	Texas Instrum.	SCM
C 26	Kondensator, elyt Capacitor, elyt	100 µF	16V		Rifa	PEG 112 GE310
C 27	Kondensator, elyt Capacitor, elyt	100 µF	16V		Rifa	PEG 112 GE310
C 28	Kondensator, elyt Capacitor, elyt	200 µF	16V		Rifa	PEG 112 GH320
C 29	Kondensator, elyt Capacitor, elyt	6,8 µF	40V		Philips	2222.015.17688
C 30	Kondensator, elyt Capacitor, elyt	470 µF	25V		Rifa	PEG 118 HD347
C 31	Kondensator, elyt Capacitor, elyt	470 µF	25V		Rifa	PEG 118 HD347
C 32	Kondensator, MP Capacitor, MP	4700 pF	630V		Rifa	PME 2616/0,0047
C 33	Kondensator, MP Capacitor, MP	4700 pF	630V		Rifa	PME 2616/0,0047

MAGNETIC AB

Pos. Nr Pos. No.	Komponentbeskrivning Description	Värde Value	Effekt Arb. sp. Rating	Tolerans Tolerance	Tillverkare Manufacturer	Typ Nr Part No.
C 34	Kondensator,elyt Capacitor,elyt	470 µF	25V		Rifa	PEG 118 HD347
C 35	Kondensator,elyt Capacitor,elyt	6,8 µF	40V		Philips	2222.015.17688
C 36	Kondensator,elyt Capacitor,elyt	220 µF	16V		Rifa	PEG 112 GH322
C 37	Kondensator,ker Capacitor,cer	1000pF	500V		Erie	831
C 38	Capacitor	Adjusted at factory				
D 1	Drossel Choke	10 µH			Gowanda	15/102
D 2	Drossel Choke	10 µH			Gowanda	15/102
D 3	Drossel Choke	10 µH			Gowanda	15/102
D 4	Drossel Choke	10 µH			Gowanda	15/102
D 5	Drossel Choke	10 µH			Gowanda	15/102
D 6	Drossel Choke	10 µH			Gowanda	15/102

Pos. Nr Pos. No.	Komponentbeskrivning Description	Värde Value	Effekt Arb. sp. Rating	Tolerans Tolerance	Tillverkare Manufacturer	Typ Nr Part No.
L 1	Spole Coil				Magnetic AB	E-11491
L 2	Spole Coil				Magnetic AB	E-11491
L 3	Spole Coil				Magnetic AB	E-11491
L 4	Spole Coil				Magnetic AB	E-11492
S 1	Omkopplare Selector	3 pol,4vägs 3 pol,4ways			Metal Products	MB3
V 1	Transistor				Mullard	AFZ 12
V 2	Transistor				Mullard	AFZ 12
V 3	Transistor				Mullard	AFZ 12
V 4	Transistor				Mullard	AFZ 12
V 5	Transistor					2N 914
V 6	Transistor					2N 1711
V 7	Transistor					2N 2905A
V 8	Transistor					2N 2905A
V 9	Transistor					2N 1711
V 10	Transistor					2N 2905A
V 11	Transistor					Deleted

MAGNETIC AB

Pos. Nr Pos. No.	Komponentbeskrivning Description	Värde Value	Effekt Arb. sp. Rating	Tolerans Tolerance	Tillverkare Manufacturer	Typ Nr Part No.
V 12	Transistor					2N 2905A
V 13	Transistor					2N 1711
V 14	Transistor					2N 1711
V 15	Transistor					2N 2905
V 16	Transistor					2N 329A
V 17	Transistor					2N 2905
V 18	Transistor					2N 2905
V 19	Transistor					2N 329A
V 20	Transistor					2N 1711
V 21	Transistor					2N 329A
V 22	Transistor					2N 329A
V 23	Transistor					2N 1711
V 24	Transistor					2N 329A
V 25	Transistor					2N 2905
Z 1	Diod Diode				Mullard	OA90
Z 2	Diod,Zener Diode,Zener				Texas Instrum./ Mullard	IS[illegible]BZY88 C3V6
Z 3	Diod,Zener Diode,Zener				Mullard	BZX. 88. C5V6
Z 4	Diod Diode				Raytheon	IN 463A

A

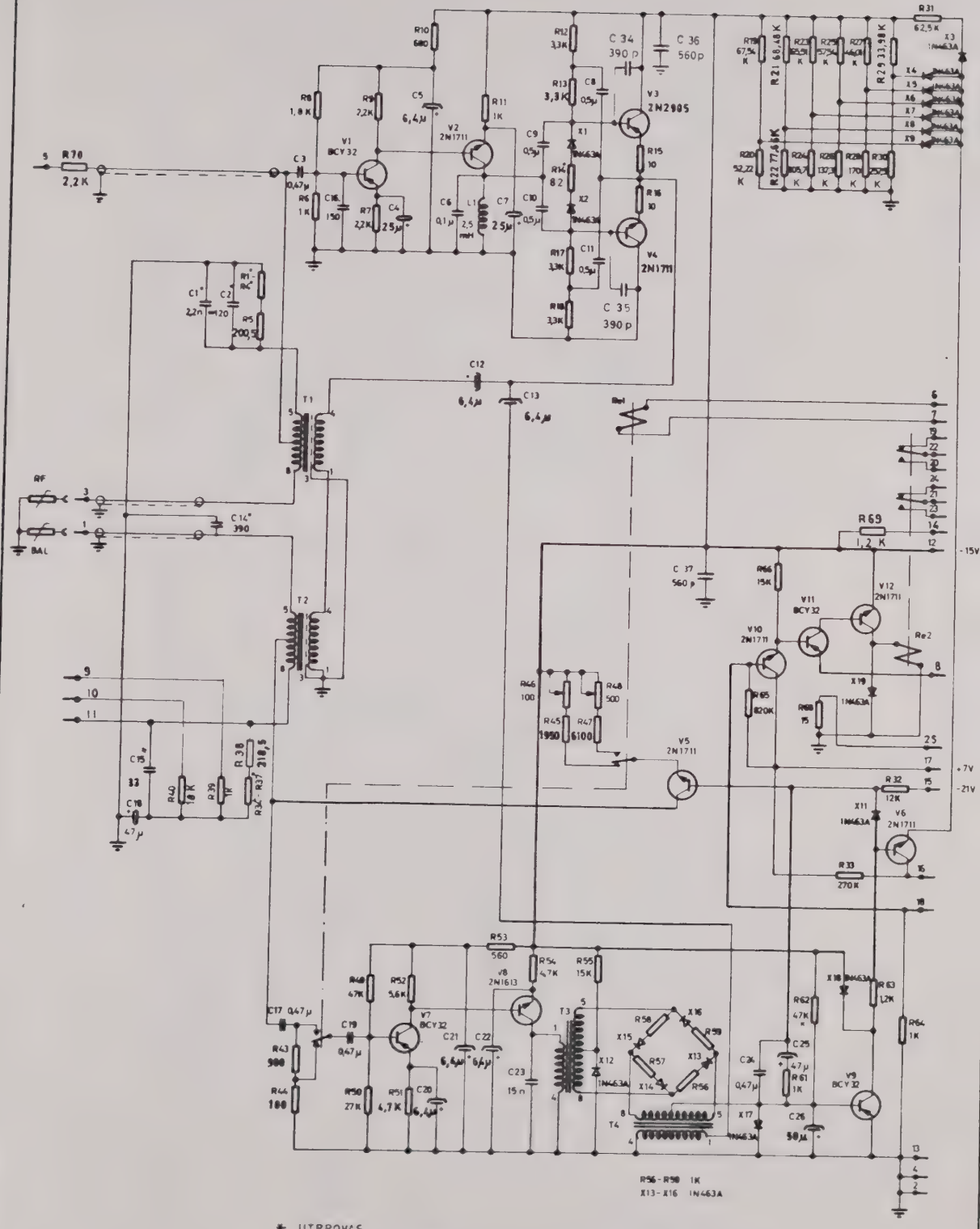
POS.NR POS.NO.	KOMPONENTBESKRIVNING DESCRIPTION	VÄRDE VALUE	EFFEKT ARB.SP. RATING	TOLERANS TOLERANCE	TILLVERKARE MANUFACTURER	TYP NR PART NO.
Z5	Diode					1N 4448
Z6	Diode					1N 4448
Z7	Diode					1N 4448
Z8	Diode					1N 4448
Z9	Diode, Zener				Mullard	BZY 88 C6V8
Z10	Diode					1N 4448
Z11	Diode					1N 4448
Z12	Diode					1N 4448
Z13	Diode					1N 4448
Z14	Diode					1N 4448
Z15	Diode					1N 4448
Z16	Diode					1N 4448
Z17	Diode					1N 4448
P1	Kontakt, koax Connector, coax				Cannon	DM 53741-5001
P2	Kontakt, 25pol Connector, 25pol				Amphenol	17-90250-16
	Komponenthållare Delas: 10+2, 7+5, 7+3+2, 6+6, 4+3+2				LME	729001/12

Magnetic AB SWEDEN

Ritn.nr E-114 513

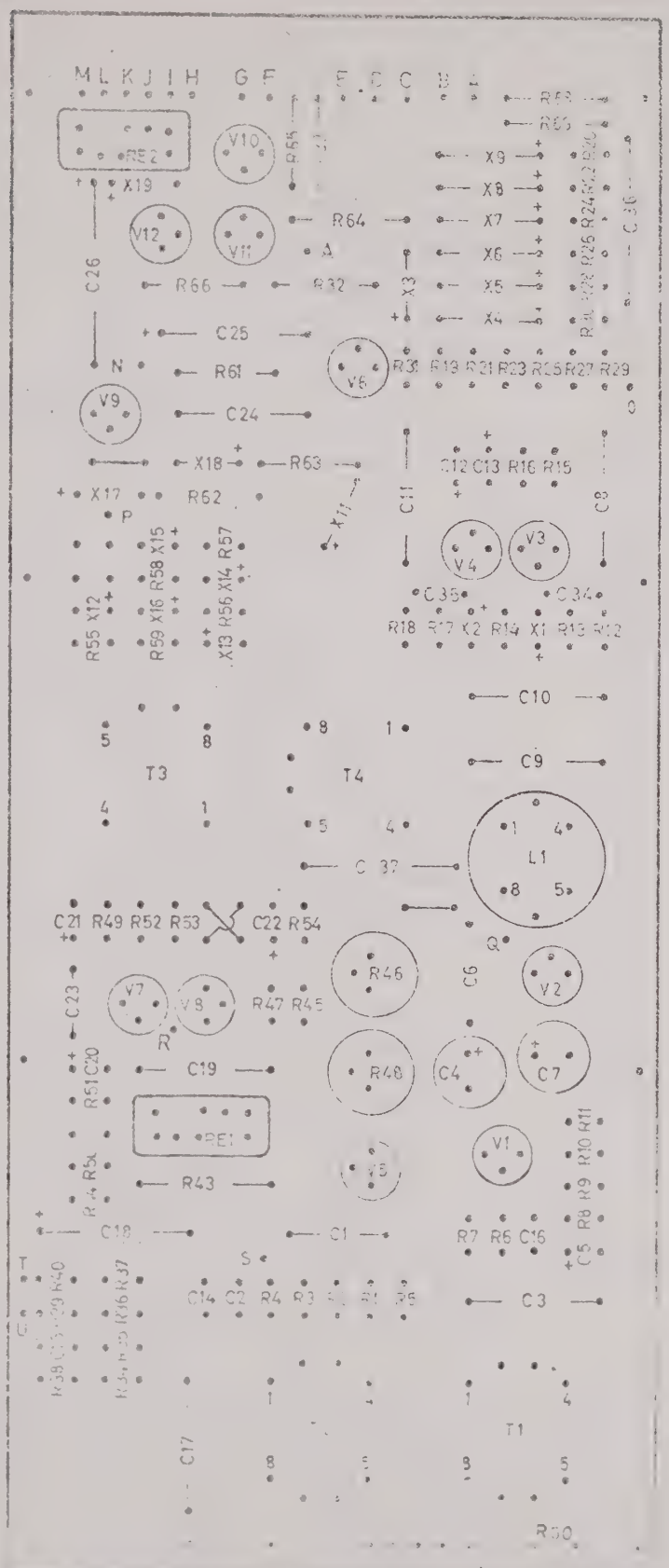
Benämning Noise Figure Meter 1141C-

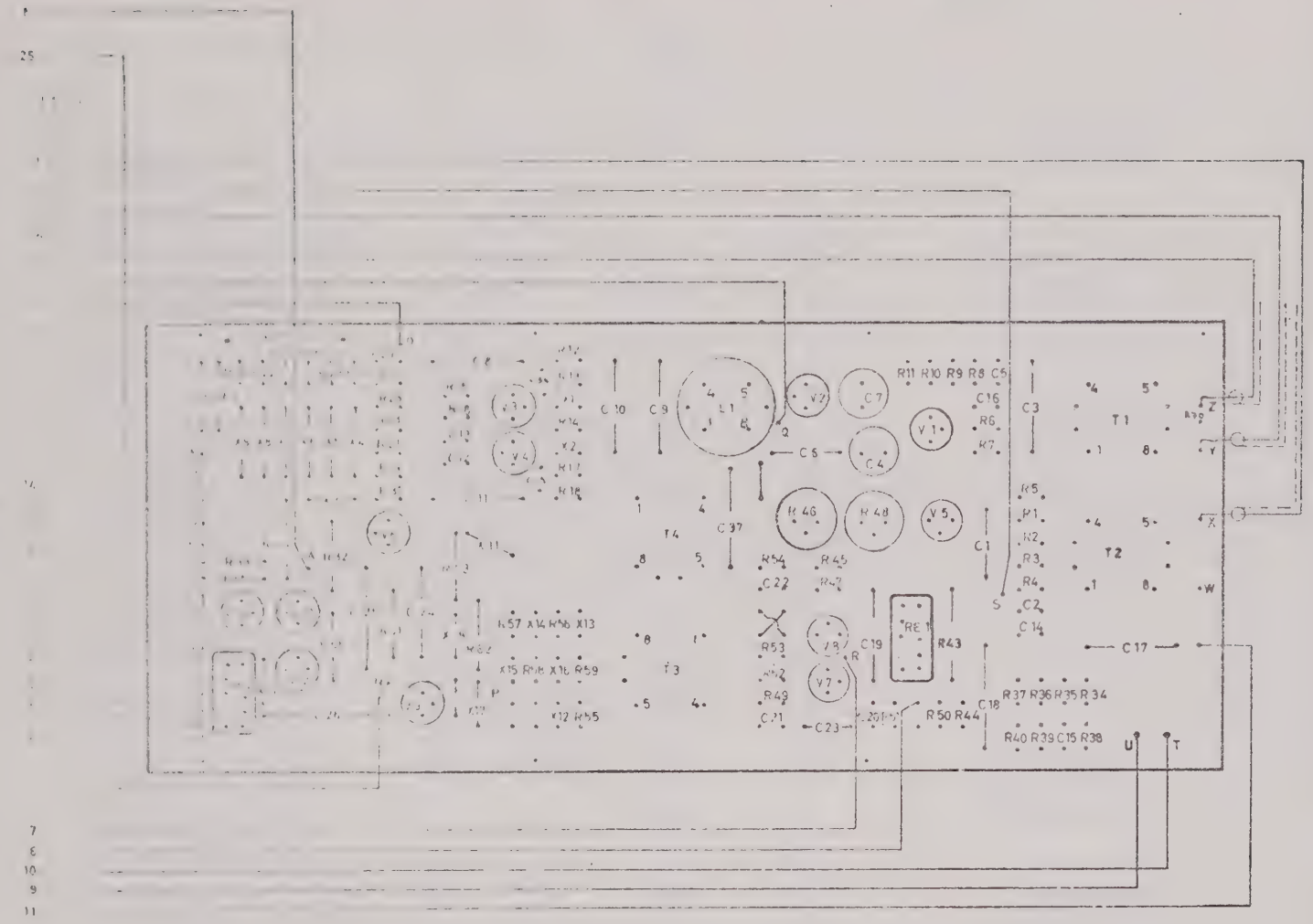
Blad 14(14)



A
25473
MK

	R Ö					
MAGNETIC AB SWEDEN		INSTICKSENHET 3111C-1		PLUG-IN UNIT 3111C-1		22.2.72
						E 311151


M L K J I H G F E D C B A
RE2
X19
V10
V12
V11
R64
C26
R66
R32
X3
C25
N
R61
V6
R31 R19 R21 R23 R25 R27 R29
V9
C24
X18
R63
C12 C13 R16 R15
X17
R62
P
C11
C8
V4
V3
C35
C34
R18 R17 X2 R14 X1 R13 R12
R55 X12
R59 X16 R58 X15
X13 R56 X14 R57
C10
5
8
8
1
T3
T4
C9
4
1
5
4
1
4
C 37
L1
8
5
C21 R49 R52 R53
C22 R54
Q
C23
V7
V8
R47 R45
R46
C6
V2
R
C19
R51 C20
R48
C4
C7
RE1
R43
V5
V1
R4 R5
C18
C1
R7 R6 C16
R8 R9 R10 R11
C5
T
S
C14
C3
R4
R3
C3
C17
T1
1
4
8
5
8
5
R30



Konstr	Ritad L K	Kop	Kontr.	Ansvar	Godkänt	Skala	Ersätter	Ersatt av
MAGNETIC AB Stockholm Sweden			Insticksenhet 3111C Forbindningsschema		Plug-in Unit 3111C Wiring Diagram		Datum 24.1.72	
							Ritn nr E- 311 145	

MAGNETIC AB

Pos. Nr Pos. No.	Komponentbeskrivning Description	Värde Value	Effekt Arb. sp. Rating	Tolerans Tolerance	Tillverkare Manufacturer	Typ Nr Part No.
C1	Kondensator, glimmer Capacitor, mica	2200 pF	500V	5 %	Elmenco	WDM 19
C2	Kondensator, styrol Capacitor, styrol	Adjusted				
C3	Kondensator, MP Capacitor, MP	0.47uF	250V		Rifa	PME 2602
C4	Kondensator, elyt Capacitor, elyt	25 uF	25V		Siemens	B 41295
C5	Kondensator, elyt Capacitor, elyt	6.4 uF	25V		Philips	C426 AR/F6.4
C6	Kondensator Capacitor	0.1 uF	100V	2 %	Rifa	PHE 2300
C7	Kondensator, elyt Capacitor, elyt	25 uF	25V		Siemens	B 41295
C8	Kondensator, MP Capacitor MP	0.47 uF	250V		Rifa	PME 2602
C9	Kondensator, MP Capacitor, MP	0.47 uF	250V		Rifa	PME 2602
C10	Kondensator, MP Capacitor, MP	0.47 uF	250V		Rifa	PME 2602
C11	Kondensator, MP Capacitor, MP	0.47 uF	250V		Rifa	PME 2602
C12	Kondensator, elyt Capacitor, elyt	6.4 uF	25V		Philips	C426 AR/F 6.4
C13	Kondensator, elyt Capacitor, elyt	6.4 uF	25V		Philips	C426 AR/F 6.4
C14	Kondensator, styrol Capacitor, styrol	Adjusted				
C15	Kondensator, styrol Capacitor, styrol	Adjusted				

Pos. Nr Pos. No.	Komponentbeskrivning Description	Värde Value	Effekt Arb.sp. Rating	Tolerans Tolerance	Tillverkare Manufacturer	Typ Nr Part No.
C16	Kondensator, styrol Capacitor, styrol	150 pF	500 V	2.5 %	Ruwel	
C17	Kondensator, MP Capacitor, MP	0.47uF	250V		Rifa	PME 2602
C18	Kondensator, tantal Capacitor, tantal	47 uF	20 V		Texas Instr.	SCM-4 47M-20V
C19	Kondensator, MP Capacitor, MP	0.47 uF	250V		Rifa	PME-2602
C20	Kondensator, elyt Capacitor, elyt	6.4 uF	25 V		Philips	C426 AR/F6.4
C21	Kondensator, elyt Capacitor, elyt	6.4 uF	25 V		Philips	C426 AR/F6.4
C22	Kondensator, elyt Capacitor, elyt	6.4 uF	25V		Philips	C426 AR/F6.4
C23	Kondensator Capacitor	0.015 uF	400V	10 %	Rifa	PME 2614
C24	Kondensator, MP Capacitor, MP	0.47 uF	250V		Rifa	PME 2602
C25	Kondensator, tantal Capacitor, tantal	47 uF	20V		Texas Instr.	SCM-4 47M-20V
C26	Kondensator, elyt Capacitor, elyt	50 uF	25V		Rifa	PEG 118A
	Kondensator Capacitor					
	Kondensator Capacitor					
	Kondensator Capacitor					
	Kondensator Capacitor					

Pos. Nr Pos. No.	Komponentbeskrivning Description	Värde Value	Effekt Arb. sp. Rating	Tolerans Tolerance	Tillverkare Manufacturer	Typ Nr Part No.
C35	Kondensator, ker. Capacitor, cer.	390 pF			Erie	831
C37	Kondensator, ker. Capacitor, cer.	390 pF			Erie	831
C36	Kondensator, glimmer Capacitor, mica	560 pF	500 V	5 %	Elmenco	CM 20
C37	Kondensator, glimmer Capacitor, mica	560 pF	500V	5 %	Elmenco	CM 20
L1	Drosseel Choke	2.5 mH				Kärna, Siemens Core, Siemens E-31136
P1	Kontakt Connector	25 pol			Amphenol	17-90250-16
R1	Motstånd Resistor	1 ohm	0.25W	2 %	ML Elektronik AG	AT-Std
R2	Motstånd Resistor	1 ohm	0.25W	2 %	ML Elektronik AB	AT-std
R3	Motstånd Resistor	1 ohm	0.25W	2 %	ML Elektronik AG	AT-Std
R4	Motstånd Resistor	2 ohm	0.25W	2 %	ML Elektronik AG	AT-Std
R5	Motstånd Resistor	200,5 ohm	0.25W	0.2 %	ML Elektronik AG	AT-ORO E

MAGNETIC AB

Pos. Nr Pos. No.	Komponentbeskrivning Description	Värde Value	Effekt Arb. sp. Rating	Tolerans Tolerance	Tillverkare Manufacturer	Typ Nr Part No.
R6	Motstånd Resistor	1 k	0.5W	5 %	Vitrohm	G BT
R7	Motstånd Resistor	2.2 k	0.5W	5 %	Vitrohm	G BT
R8	Motstånd Resistor	1.8 k	0.5W	5 %	Vitrohm	GBT
R9	Motstånd Resistor	2.2 k	0.5W	5 %	Vitrohm	GBT
R10	Motstånd Resistor	680 ohm	0.5W	5 %	Vitrohm	GBT
R11	Motstånd Resistor	1 k	0.5W	5 %	Vitrohm	GBT
R12	Motstånd Resistor	3.3 k	0.5W	5 %	Vitrohm	GBT
R13	Motstånd Resistor	3.3 k	0.5W	5 %	Vitrohm	GBT
R14	Motstånd Resistor	10 ohm	0.5W	5 %	Vitrohm	GBT
R15	Motstånd Resistor	10 ohm	0.5W	5 %	Vitrohm	GBT
R16	Motstånd Resistor	10 ohm	0.5W	5 %	Vitrohm	GBT
R17	Motstånd Resistor	3.3 k	0.5W	5 %	Vitrohm	GBT
R18	Motstånd Resistor	3.3 k	0.5W	5 %	Vitrohm	GBT
R19	Motstånd Resistor	67.54 k	0.25W	0.5 %	ML Elektronik AG	AT-Std
R20	Motstånd Resistor	52.22 k	0.25W	0.5 %	ML Elektronik AG	AT-Std

MAGNETIC AB

Pos. Nr Pos. No.	Komponentbeskrivning Description	Värde Value	Effekt Arb. sp. Rating	Tolerans Tolerance	Tillverkare Manufacturer	Typ Nr Part No.
R21	Motstånd Resistor	68.48 k	0.25W	0.5 %	ML Elektronik AG	AT-Std
R22	Motstånd Resistor	77.66 k	0.25W	0.5 %	ML Elektronik AG	AT-Std
R23	Motstånd Resistor	65.51 k	0.25W	0.5 %	ML Elektronik AG	AT-Std
R24	Motstånd Resistor	105.7 k	0.25W	0.5 %	ML Elektronik AG	AT-Std
R25	Motstånd Resistor	57.54 k	0.25 W	0.5 %	ML Elektronik AG	AT-Std
R26	Motstånd Resistor	137.3 k	0.25W	0.5 %	ML Elektronik AG	AT-Std
R27	Motstånd Resistor	46.01 k	0.25 W	0.5 %	ML Elektronik AG	AT-Std
R28	Motstånd Resistor	170.0 k	0.25W	0.5 %	ML Elektronik AG	AT-Std
R29	Motstånd Resistor	33.98 k	0.25W	0.5 %	ML Elektronik AG	AT-Std
R30	Motstånd Resistor	257.5 k	0.25W	0.5 %	ML Elektronik AG	AT-Std
R31	Motstånd Resistor	62.5 k	0.25W	0.5 %	ML Elektronik AG	AT-Std
R32	Motstånd Resistor	12 k	0.5 W	5 %	Vitrohm	GBT
R33	Motstånd Resistor	270 k	0.5W	5 %	Vitrohm	GBT
R34	Motstånd Resistor	1 ohm	0.25W	2 %	ML Elektronik AG	AT-Std
R35	Motstånd Resistor	1 ohm	0.25W	2 %	ML Elektronik AG	AT-Std

E-311151 5(9)

MAGNETIC AB

Pos. Nr Pos. No.	Komponentbeskrivning Description	Värde Value	Effekt Arb. sp. Rating	Tolerans Tolerance	Tillverkare Manufacturer	Typ Nr Part No.
R36	Motstånd Resistor	1 ohm	0.25W	2 %	ML Elektronik AG	AT-Std
R37	Motstånd Resistor	2 ohm	0.25W	2 %	ML Elektronik AG	AT-Std
R38	Motstånd Resistor	218.5	0.25W	0.2 %	ML Elektronik AG	AT-ORO E
R39	Motstånd Resistor	1 k	0.25W	2 %	ML Elektronik AG	AT-Std
R40	Motstånd Resistor	18 k	0.25W	5 %	ML Elektronik AG	AT-Std
R43	Motstånd Resistor	900 ohm	0,25W	2 %	ML Elektronik AG	AT-Std
R44	Motstånd Resistor	100 ohm	0,25W	2 %	ML Elektronik AG	AT-Std
R45	Motstånd Resistor	1950 ohm	0.25W	1 %	ML Elektronik AG	AT-Std
R46	Motstånd, var. Resistor, var.	100 ohm	0.5W	5 %	Spectrol(BAY&Co)	82-3-8
R47	Motstånd Resistor	6100 ohm	0.25W	1 %	ML Elektronik AG	AT-Std
R48	Motstånd, var. Resistor	500 ohm	0,5W	5 %	Spectrol (BAY&Co)	82-3-8
R49	Motstånd Resistor	47 k	0.5W	5 %	Vitrohm	GBT
R50	Motstånd Resistor	27 k	0.5W	5 %	Vitrohm	GBT

MAGNETIC AB

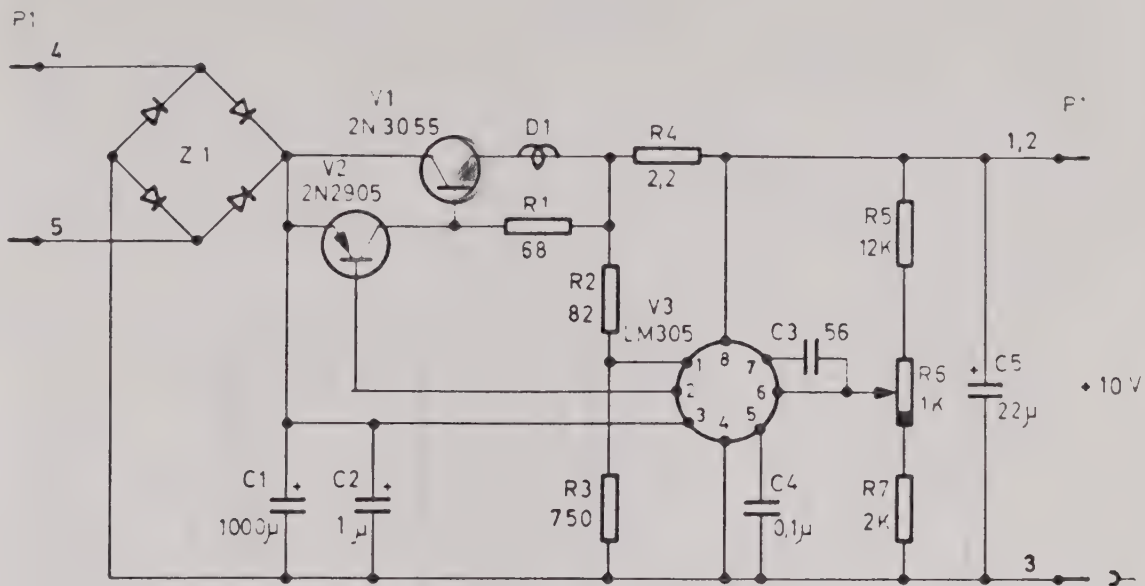
Pos. Nr Pos. No.	Komponentbeskrivning Description	Värde Value	Effekt Arb. sp. Rating	Tolerans Tolerance	Tillverkare Manufacturer	Typ Nr Part No.
R51	Motstånd Resistor	4.7 k	0.5W	5 %	Vitrohm	GBT
R52	Motstånd Resistor	5.6 k	0.5 W	5 %	Vitrohm	GBT
R53	Motstånd Resistor	560 ohm	0.5W	5 %	Vitrohm	GBT
R54	Motstånd Resistor	4.7 k	0.5W	5 %	Vitrohm	GBT
R55	Motstånd Resistor	15 k	0.5W	5 %	Vitrohm	GBT
R56	Motstånd Resistor	1 k	0.25W	2 %	ML Elektronik AG	AT-Std
R57	Motstånd Resistor	1 k	0.25W	2 %	ML Elektronik AG	AT-Std
R58	Motstånd Resistor	1 k	0.25W	2 %	ML Elektronik AG	AT-Std
R59	Motstånd Resistor	1 k	0.25W	2 %	ML Elektronik AG	AT-Std
R60	Motstånd Resistor	2.2 k	0.5W	5 %	Vitrohm	GBT
R61	Motstånd Resistor	1 k	0.5W	5 %	Vitrohm	GBT
R62	Motstånd Resistor	47 k	0.5W	5 %	Vitrohm	GBT
R63	Motstånd Resistor	1.2 k	0.5W	5 %	Vitrohm	GBT
R64	Motstånd Resistor	1 k	0.25W	0.2 %	ML Elektronik AG	AT ORO E
R65	Motstånd Resistor	820 k	0.5W	5 %	Vitrohm	GBT

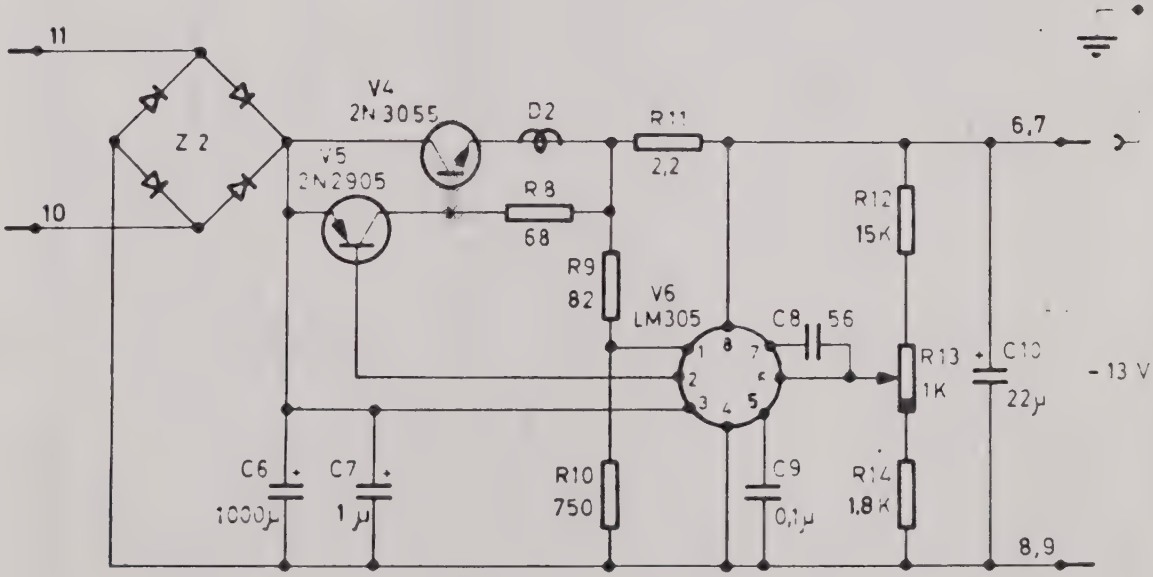
Pos. Nr Pos. No.	Komponentbeskrivning Description	Värde Value	Effekt Arb. sp. Rating	Tolerans Tolerance	Tillverkare Manufacturer	Typ Nr Part No.
R66	Motstånd Resistor	15 k	0.5W	5 %	Vitrohm	104
R68	Motstånd Resistor	15 ohm	0.5W	5 %	Vitrohm	104
R69	Motstånd Resistor	1.2 k	0.5W	5 %	Vitrohm	104
R70	Motstånd Resistor	2.2 k	0.5W	5 %	Vitrohm	
Re1	Relä Relay	26V 700 ohm			Babcock	BR26-S113-700-A1-26
Re2	Relä Relay	26V 700 ohm			Babcock	BR26-S113-700-A1-26
T1	Transformator Transformer					E-31137
T2	Transformator Transformer					E-31137
T3	Transformator Transformer					E-31138
T4	Transformator Transformer					E-31138

MAGNETIC AB

Pos. Nr Pos. No.	Komponentbeskrivning Description	Värde Value	Effekt Arb. sp. Rating	Tolerans Tolerance	Tillverkare Manufacturer	Typ Nr Part No.
V1	Transistor, silicon				Mullard	BCY 32
V2	Transistor, silicon				Raytheon	2N 1711
V3	Transistor, silicon				Mullard	BCY 32
V4	Transistor, silicon				Raytheon	2N 1613
V5	Transistor, silicon				Raytheon	2N 1711
V6	Transistor, silicon				Raytheon	2N 1711
V7	Transistor, silicon				Mullard	BCY 32
V8	Transistor, silicon				Raytheon	2N 1613
V9	Transistor, silicon				Mullard	BCY 32
V10	Transistor, silicon				Raytheon	2N 1711
V11	Transistor, silicon				Mullard	BCY 32
V12	Transistor, silicon				Raytheon	2N 1711
X1-X9,X11-X19	Diod, silicon				Raytheon	1N 463A

RITNING ÄR EGENDOM SOM ATT UTAN VÅRT MEDGIVANDE MÅNGFALDIGA, FÖREVISA, UTLÄMNA ELLER ELJEST OBEHÖRIGEN ANVÄNDA OBNÄMNDA ÄR FÖRBJUDET OCH BEIVRAS MED STÖD AV LAG AV DEN 30 MAJ 1919 SAMT LAG AV DEN 29 MAJ 1931 § 3





KOMPONENTPLACERING
COMPONENT LAYOUT | E-001430

	A	Beteckning							
		R D							

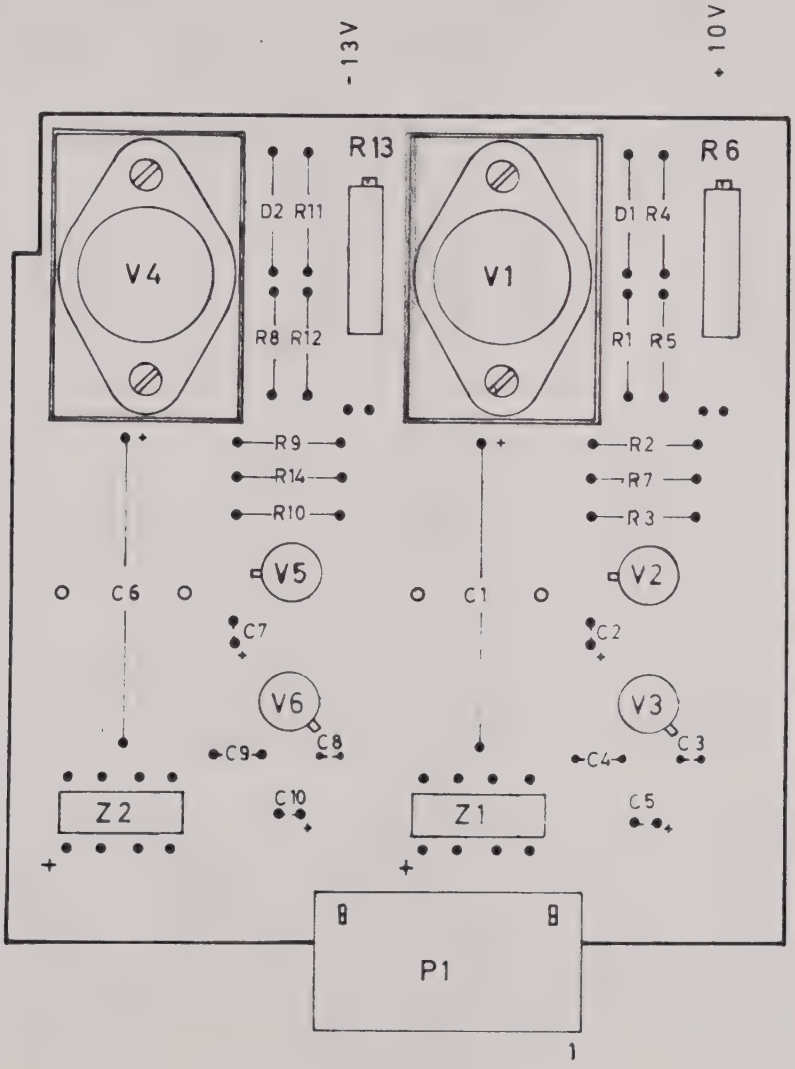
MAGNETIC AB
Stockholm Sweden

LIKRIKTARE
PRINCIPSCHEMA

POWER SUPPLY
CIRCUIT DIAGRAM

E-001429

DENNA RITNING FÖRBLIVER VÅR EGENDOM, ATT UTAN VÅRT MEDGIVANDE MÅNGFALDIGA, FÖREVISA, UTLÄMNA ELLER ELJEST OBEHÖRIGEN ANVÄNDA DENSAMMA ÄR FÖRBJUDET OCH BEIVRAS MED STÖD AV LAG AV DEN 30 MAJ 1919 SAMT LAG AV DEN 29 MAJ 1931 § 3.



Kodning stift nr.9
C1 och C6 bindes fast.
V1 och V4 monteras med kylfäns E-001378 och Distans E-211131
D1 och D2 fixeras med K.K. eller dyligt.

A 730516 PG								Principschema E-001429		
								Hålritning E-001431		
Det.-nr	Ant	Benämning			Material			Anm		
Konstr	Ritad CG	Kop	Kontr	Stand.	Godk	Skala		Ersätter	Ersatt av	
MAGNETIC AB Stockholm Sweden		LIKRIKTARE -13V, +10V Komponentplacering			POWER SUPPLY -13V, +10V Component Layout			Blad	Sht 7671 YS	
								Ritn.-nr E-001430		

E-001429 Likriktare
Power Supply

MAGNETIC AB

Pos. Nr Pos. No.	Komponentbeskrivning Description	Värde Value	Effekt Arb. sp. Rating	Tolerans Tolerance	Tillverkare Manufacturer	Typ Nr Part No.
R1	Motstånd Resistor	68 ohm	0.5 W	5%	Vitrohm	GBT
R2	Motstånd Resistor	82 ohm	0.5 W	5%	Vitrohm	GBT
R3	Motstånd Resistor	750 ohm	0.5 W	5%	Vitrohm	GBT
R4	Motstånd Resistor	2.2 ohm	6 W	10%	Painton	5101
R5	Motstånd Resistor	12 kohm	0.125 W	1%	Vitrohm	CEA T2
R6	Motstånd, var. Resistor, var.	1 kohm	0.5 W		Bourns (Helipot)	3009 P (79P,89P)
R7	Motstånd Resistor	2 kohm	0.125 W	1%	Vitrohm	CEA T2
R8	Motstånd Resistor	68 ohm	0.5 W	5%	Vitrohm	GBT
R9	Motstånd Resistor	82 ohm	0.5 W	5%	Vitrohm	GBT
R10	Motstånd Resistor	750 ohm	0.5 W	5%	Vitrohm	GBT
R11	Motstånd Resistor	2.2 ohm	6 W	10%	Painton	5101
R12	Motstånd Resistor	15 kohm	0.125 W	1%	Vitrohm	CEA T2
R13	Motstånd, var. Resistor, var.	1 kohm	0.5 W		Bourns (Helipot)	3009P (79P,89P)
R14	Motstånd Resistor	1,8kohm	0.125 W	1%	Vitrohm	CEA T2

E-001429

MAGNETIC AB

Pos. Nr Pos. No.	Komponentbeskrivning Description	Värde Value	Effekt Arb. sp. Rating	Tolerans Tolerance	Tillverkare Manufacturer	Typ Nr Part No.
C1	Kondensator, elyt Capacitor, elyt	1000 µF	25 V		Rifa	PEG 118 HG 410
C2	Kondensator, tantal Capacitor, tantalum	1 µF	35 V		ITT	TAG 1/35
C3	Kondensator, ker. Capacitor, cer.	56 pF	63 V	2%	LCC	GOP746 J4
C4	Kondensator, ker. Capacitor, cer.	0.1 µF	30 V		Erie	811
C5	Kondensator, tantal Capacitor, tantalum	22 µF	16 V		ITT	TAG 22/16
C6	Kondensator, elyt Capacitor, elyt	1000 µF	40 V		Rifa	PEG 119 KJ 410
C7	Kondensator, tantal Capacitor, tantalum	1 µF	35 V		ITT	TAG 1/35
C8	Kondensator, ker. Capacitor, cer.	56 pF	63 V		LCC	GOP746 J4
C9	Kondensator, ker. Capacitor, cer.	0.1 µF	30 V		Erie	811
C10	Kondensator, tantal Capacitor, tantalum	22 µF	16 V		ITT	TAG 22/16
D1	Drossel Choke	4 st i serie 4 beads in series			Philips	4322 020 34400
D2	Drossel Choke	4 st i serie 4 beads in series			Philips	4322 020 34400
P1	Kontakt, 11 pol Connector, 11 ways				ITT	12-212-001

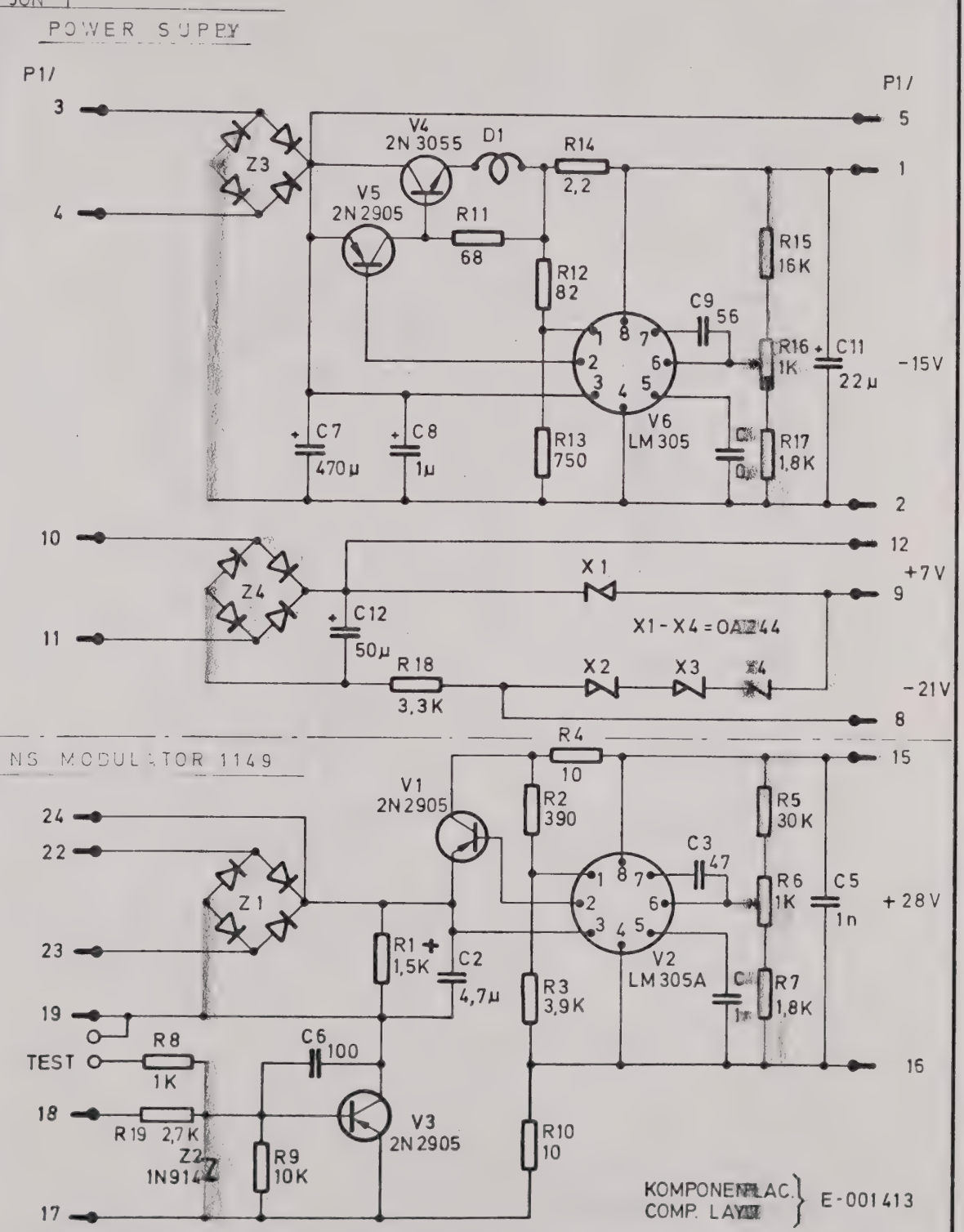
E-001429 2(3)

MAGNETIC AB

Pos. Nr Pos. No.	Komponentbeskrivning Description	Värde Value	Effekt Arb. sp. Rating	Tolerans Tolerance	Tillverkare Manufacturer	Typ Nr Part No.
	Mellanlägg Spacer				ITT	14-007-021
	Nit Rivet	2 st 2 pcs			ITT	14-014-002
	Kodlist Code strip	1 st 1 pc			ITT	14-022-039
V1	Transistor					2N 3055
V2	Transistor					2N 2905
V3	Integrerad krets IC				NS	LM 305
V4	Transistor					2N 3055
V5	Transistor					2N 2905
V6	Integrerad krets IC				NS	LM 305
Z1	Likriktare, brygga Rectifier, bridge				Philips (Varo)	BY 164 (VS 148) or 4x1N 4007
Z2	Likriktare, brygga Rectifier, bridge				Philips (Varo)	BY 164 (VS 148) or 4x1N 4007
	2 st kylfläns				Magnetic AB	E-001378
	4 st distans				Magnetic AB	E-211131
	1 st kabelklammer				Insuloid	MX2
	2 st underlägg f.TO5	(V2 o. V5)			Jermyn	TO5-001 eller liknan
	2 st underlägg	(V3 o.V6)			Jermyn	MON-8L eller liknand

E-001429 3(3)

Ändr Bokst		Dat	Sign
A 770629 JON			

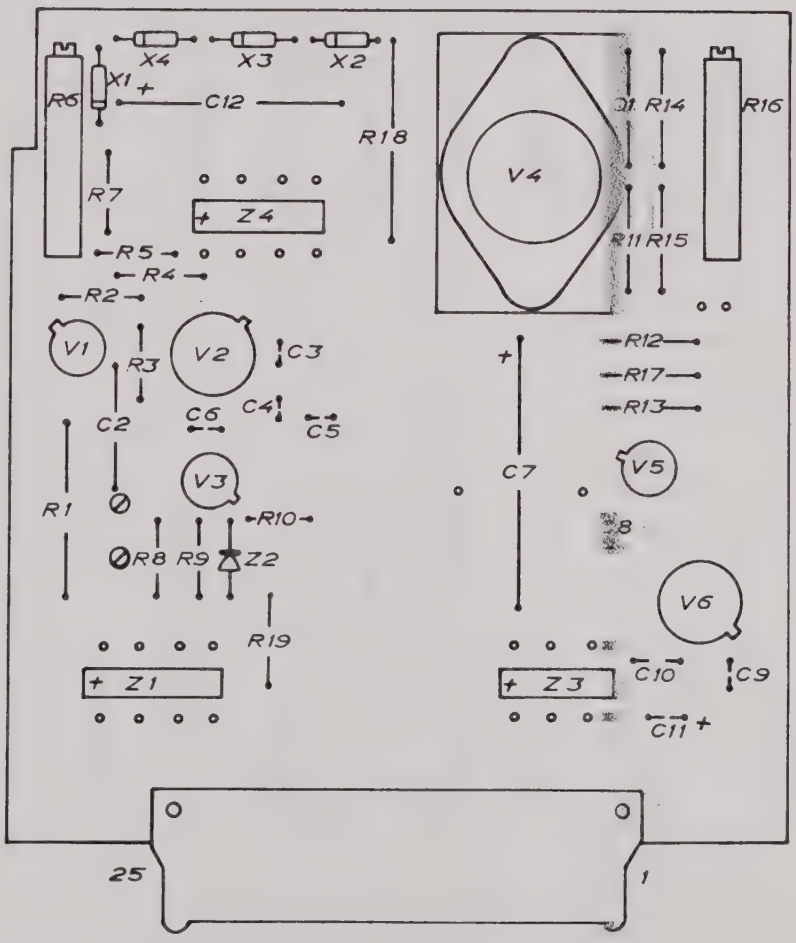


Det nr	Ant	Benämning	Material	Anm
Konstr	Ritad L.T.	Kop	Kontr	Stand	Godk	Skala	Ersatter	Ersatt av

MAGNETIC AB Stockholm Sweden	LIKRIKTARE -21V, -15V, +7V MODULATOR 1149 PRINCIPSCHEMA	POWER SUPPLY -21V, -15V, +7V MODULATOR 1149 CIRCUIT DIAGRAM	Blad / Dat: 72 04 20 Ritn nr E001 414

Denna ritning är vår egendom och skyddad enligt gällande lag samt får ej utan vårt medgivande kopieras, delgivas annan eller obehörigen användas.

Bokst	Ändringens art	Dat.	Sign
A 770630 JON			



KODNING STIFT 13

PRINCIPSCHEMA E-001 414

HÅLRITNING E-001 412

Det.-nr	Ant	Benämning	Material	Anm

Konstr	Ritad	Kop	Kontr	Stand	Godk	Skala	Ersätter	Ersatt av
	LT					1:1		

MAGNETIC AB

Stockholm Sweden

LIKRIKTARE . MODULATOR
KOMPONENTPLACERING

POWER SUPPLY. MODULATOR
COMPONENT LAYOUT

Blad	Dat.
	720428

Ritn.-nr **E-001 413**

Denna ritning är vår egendom och skyddad enligt gällande lag samt får ej utan vårt medgivande kopieras, delgivas annan eller obehörigen användas.

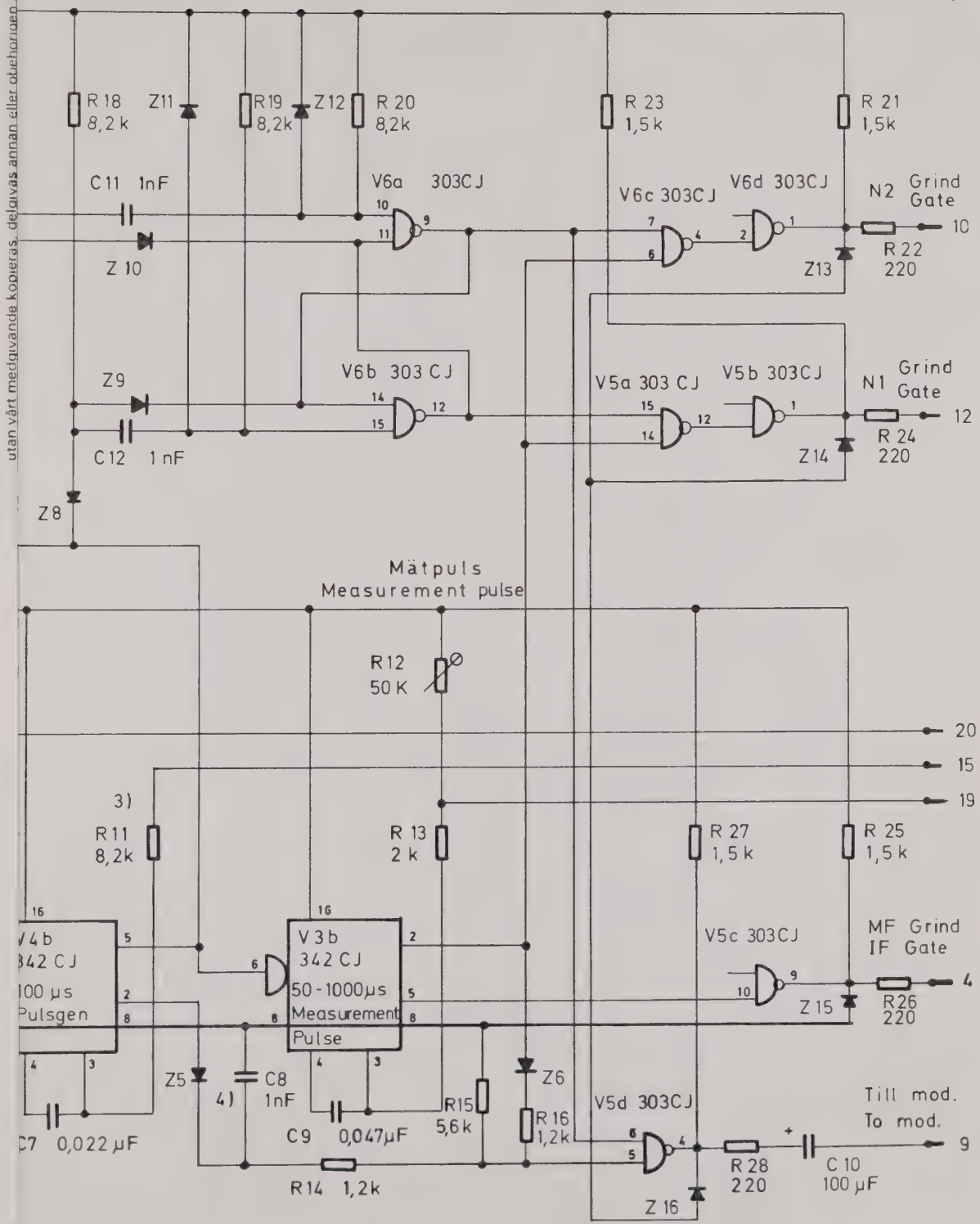
Pos. Nr Pos. No.	Komponentbeskrivning Description	Värde Value	Effekt Arb. sp. Rating	Tolerans Tolerance	Tillverkare Manufacturer	Typ Nr Part No.
R1	Motstånd Resistor	1,5 kohm	5,5 W	5 %	Philips	2322 320 32
R2	Motstånd Resistor	390 ohm	0,25 W	5 %	Kamaya	RC-1/4 S
R3	Motstånd Resistor	3,9 kohm	0,25 W	5 %	Kamaya	RC-1/4 S
R4	Motstånd Resistor	10 ohm	0,25 W	5 %	Kamaya	RC-1/4 S
R5	Motstånd Resistor	30 kohm	0,125 W	1 %	Vitrohm	CEA T2
R6	Motstånd, var Resistor, var	1 kohm	0,5 W		Bourns (Helipot)	3009 P (79 P, 89 P
R7	Motstånd Resistor	1,8 kohm	0,125 W	1 %	Vitrohm	CEA T2
R8	Motstånd Resistor	1 kohm	0,25 W	5 %	Kamaya	RC-1/4 S
R9	Motstånd Resistor	10 kohm	0,25 W	5 %	Kamaya	RC-1/4 S
R10	Motstånd Resistor	10 ohm	0,25 W	5 %	Kamaya	RC-1/4 S
R11	Motstånd Resistor	68 ohm	0,5 W	5 %	Vitrohm	CBT
R12	Motstånd Resistor	82 ohm	0,5 W	5 %	Vitrohm	CBT

Pos. Nr Pos. No.	Komponentbeskrivning Description	Värde Value	Effekt Arb. sp. Rating	Tolerans Tolerance	Tillverkare Manufacturer	Typ Nr Part No.
R13	Motstånd Resistor	750 ohm	0,5 W	5 %	Vitrohm	CBT
R14	Motstånd Resistor	2,2 ohm	6 W	10 %	Painton	5101
R15	Motstånd Resistor	16 kohm	0,125 W	1 %	Vitrohm	CEA T2
R16	Motstånd, var Resistor, var	1 kohm	0,5 W		Bourns (Helipot)	3009 P (79P, 89P)
R17	Motstånd Resistor	1,8 kohm	0,125 W	1 %	Vitrohm	CEA T2
R18	Motstånd Resistor	3,3 kohm	5,5 W	5 %	Philips	83540
R19	Motstånd	2,7 kohm	0,25 W	5 %	Vitrohm	100-0
C2	Kondensator, tantal Capacitor, tantalum	4,7 uF	50 V	20 %	ITT	472/LWA/401 LA
C3	Kondensator, ker. Capacitor, cer.	47 pF				
C4	Kondensator, ker. Capacitor, cer.	1 nF				
C5	Kondensator, ker. Capacitor, cer.	1 nF				
C6	Kondensator, ker. Capacitor, cer.	100 pF				

Pos. Nr Pos. No.	Komponentbeskrivning Description	Värde Value	Effekt Arb. sp. Rating	Tolerans Tolerance	Tillverkare Manufacturer	Typ Nr Part No.
C7	Kondensator, elyt Capacitor, elyt	470 uF	40 V		Rifa	PEG 118 KF 347
C8	Kondensator, tantal Capacitor, tantalum	1 uF	35 V		ITT	TAC 1/35
C9	Kondensator, ker. Capacitor, cer.	56 pF	63 V	2 %	LCC	COP746 J4
C10	Kondensator, ker. Capacitor, cer.	0,1 uF	30 V		Erie	811
C11	Kondensator, tantal Capacitor, tantalum	22 uF	16 V		ITT	TAC 22/16
C12	Kondensator, elyt Capacitor, elyt	50 uF	100 V		Rifa	PEG 118 D
D1	Drossel Choke	4 st i serie 4 beads in series			Philips	4322 020 34400
P1	Kontakt, 25 pol Connector, 25 ways	1st 1pc			ITT	12-211-001
	Mellanlägg Spacer	1st 1pc			ITT	14-007-011
	Nit Rivet	2 st 2 pc			ITT	14-014-002
	Kodlist Code strip	1st 1pc			ITT	14-022-038

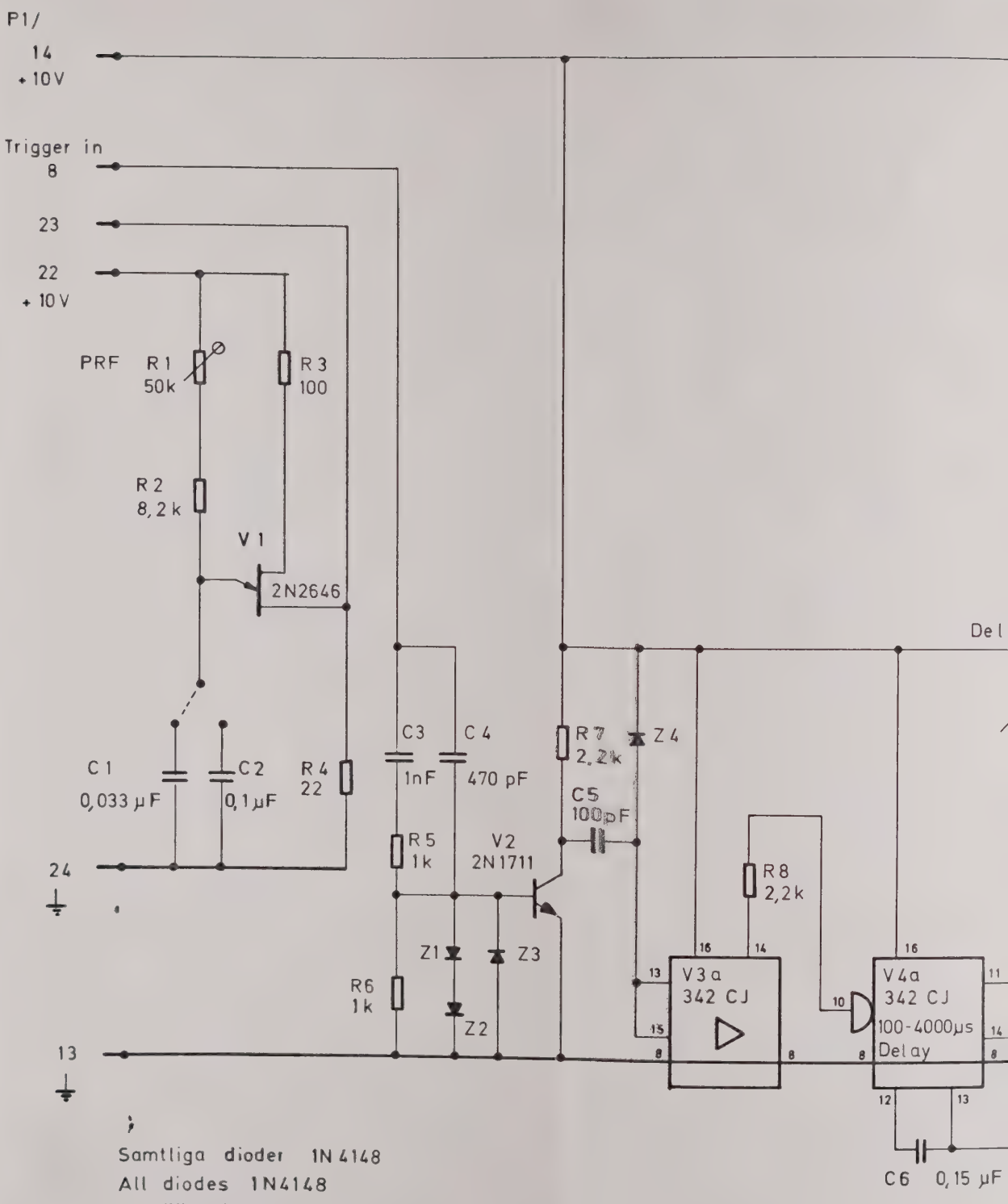
Pos. Nr Pos. No.	Komponentbeskrivning Description	Värde Value	Effekt Arb. sp. Rating	Tolerans Tolerance	Tillverkare Manufacturer	Typ Nr Part No.
V1	Transistor					2N 2905
V2	IC				NS	LM 305A
V3	Transistor					2N 2905
V4	Transistor					2N 3055
V5	Transistor					2N 2905
V6	IC				NS	LM 305
	3 st underlägg f. T05 1 st underlägg	(V1, V3 o. V5) (V2 o. V6)			Jermyn Jermyn	T05-001 eller likn. MON-8L eller likn.
X1-X4	Diod, zener Diode, zener		6,8 V/400 mW		Mullard	OAZ 244 BZX 79 C6V8 or 1N754A
Z1	Likriktare, brygga Rectifier, bridge				Philips (Varo)	BY 164 (VS 148) or 4x1N4007
Z2	Diod Diode					1N 4148
Z3	Likriktare, brygga Rectifier, bridge				Philips (Varo)	BY 164 (VS 148)
Z4	Likriktare, brygga Rectifier, bridge				Philips (Varo)	BY 164 (VS 148)
	1 st kylfläns 2 st distans 1 st kabelklammer				Magnetic AB Magnetic AB Insuloid	E-001378 E-211131 NX2

Denna ritning är vår egendom och skyddad enligt gällande lag samt får e
utan vårt medgivande kopieras, delgivas annan eller obehörigen användas.



									KOMP. PLAC.	E-001 422
									HÅLRITNING	E-001 421
Det.-nr	Ant	Benämning		Material					Anm	
Konstr	Ritad	Kontr		Utarb		Skala			Ersatter	Ersatt av
Magnetic AB SWEDEN		PRESTANDAMETER PULSENHET PRINCIPSCHEMA		RADAR MONITOR PULSE UNIT CIRCUIT DIAGRAM					Blad	Dat 781204 JON
									Ritn. nr	E-001 419

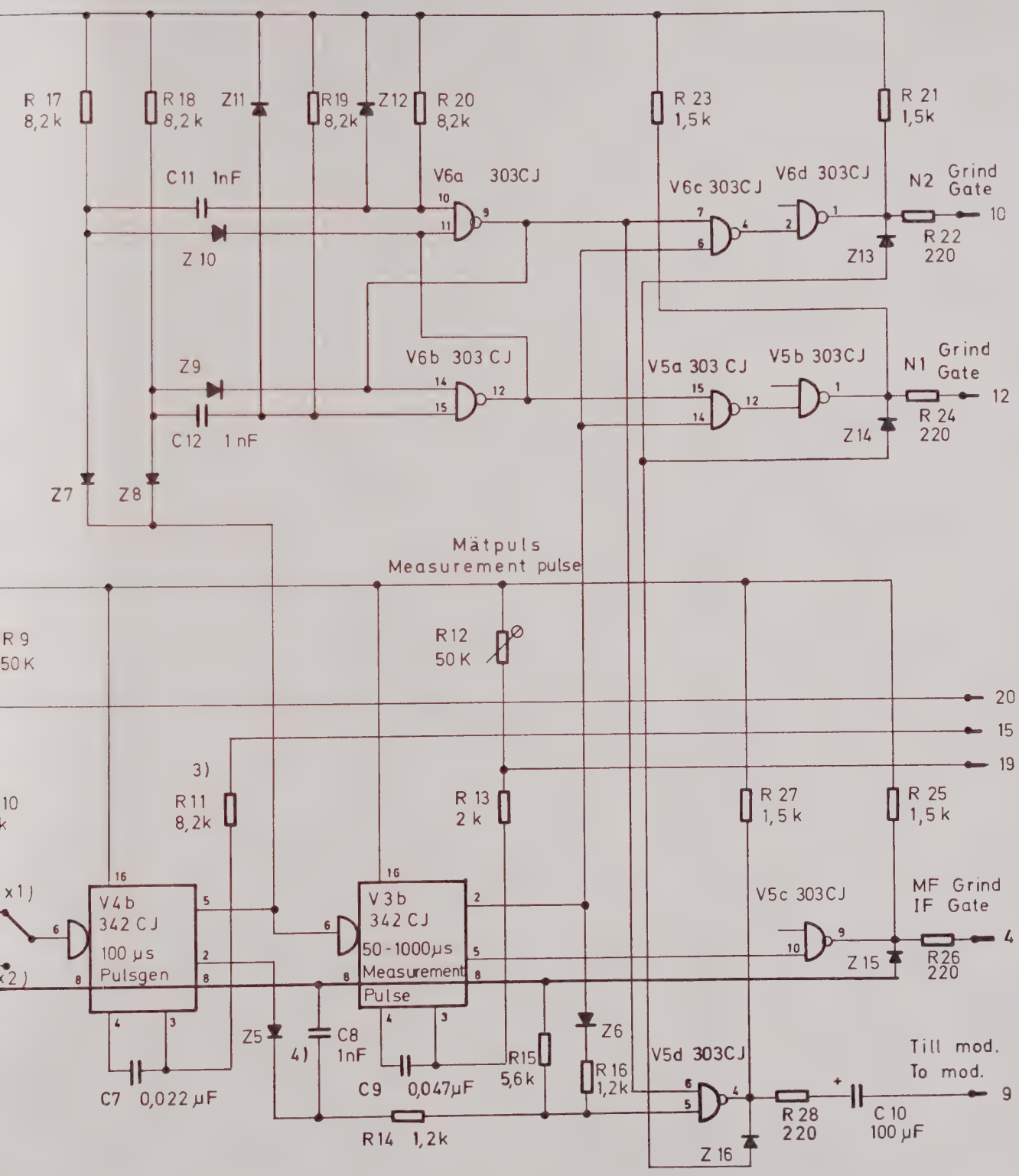
Denna ritning är vår egendom och skyddad enligt gällande lag samt får e
utan vårt medgivande kopieras, delgivas annan eller obehörigen användas



Samtliga dioder 1N4148
All diodes 1N4148
x1) Fördröjd. Delayed
x2) Direkt. Direct
3) For 80µs R11 is 6,8k
4) For solid state generator
do not use Z5

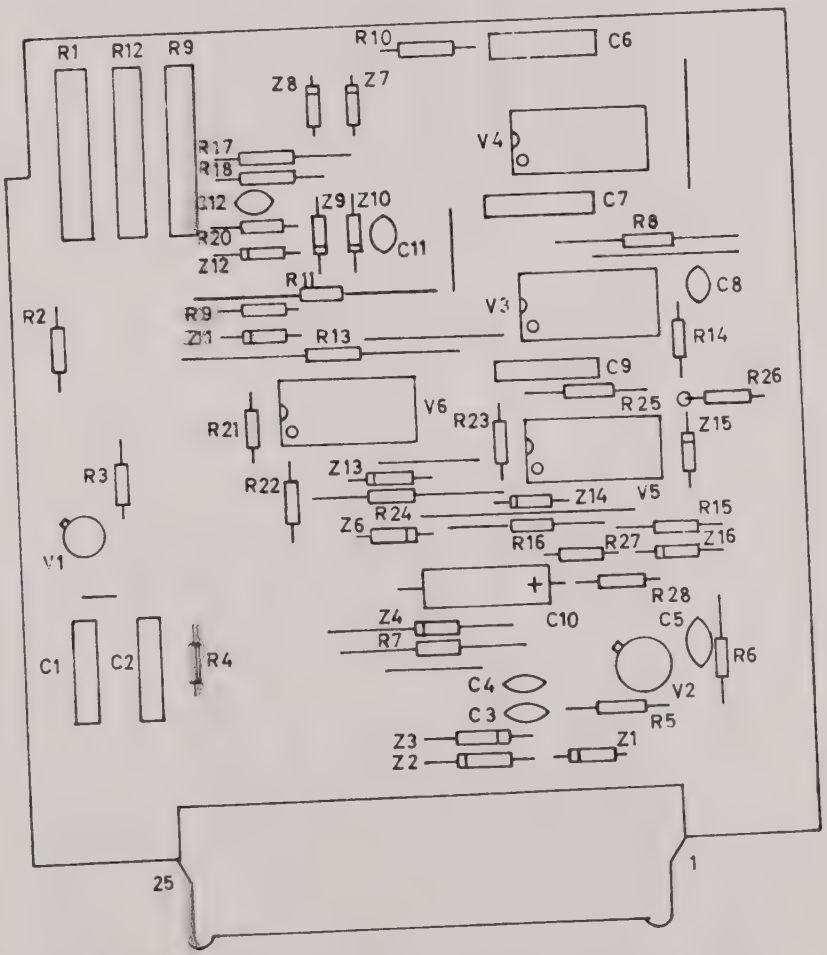
V3b, Measurement pulse generator
V4a, Delay generator
V4b, Pre-fire generator

B
750901
JON
Andr
Bokst



								KOMP. PLAC.	E-001 422
								HÅLRITNING	E-001 421
Det.-nr	Ant.	Benämning			Material			Anm	
Konstr	Ritad	Kop	Kontr	Stand		Skala		Ersatter	Ersatt av
Magnetic AB SWEDEN		PRESTANDAMETER PULSENHET PRINCIPSCHEMA		RADAR MONITOR PULSE UNIT CIRCUIT DIAGRAM				Blad	Dat 781204 JON
								Ritn.-nr	E-001 419

Nr	Ändring och eller medd.-nr	Datum	Sk.



C 730516 PG	
B 720102 LT	
A 720420	KODNING STIFT 7

							Anm.	
Det.-nr	Ant.	Benämning			Material	Mod.-nr Ämne Dimension	Ersatter	Ersatt av
Konstr.	Ritad	Kop.	Kontr.	Stand.	Godk.	Skala		Dat. 7.3.72

MAGNETIC AB

PULSENHET
KOMPONENT-PLACERING

PULSE UNIT
COMPONENT LAYOUT

Ritn.-nr E-001422

7085-44
A4 - 1,11

Pos. Nr Pos. No.	Komponentbeskrivning Description	Värde Value	Effekt Arb.sp. Rating	Tolerans Tolerance	Tillverkare Manufacturer	Typ Nr Part No.
R 1	Motstånd, var Resistor	50 kohm	0.75W	20 %	Helipot or equiv	78 P
R 2	Motstånd, metall film Resistor, metal film	8.2 kohm	0.125W	1 %	Vitrohm	CEA
R 3	Motstånd, comp Resistor, comp	100 ohm	0.25W	5 %	Vitrohm or equiv	
R 4	Motstånd, comp Resistor, comp	22 ohm	0.25W	5 %	Vitrohm or equiv	
R 5	Motstånd, comp Resistor, comp	1 kohm	0.25W	5 %	Vitrohm or equiv	
R 6	Motstånd, comp Resistor, comp	1 kohm	0.25W	5 %	Vitrohm or equiv	
R 7	Motstånd, comp Resistor, comp	2.2 kohm	0.25W	5 %	Vitrohm or equiv	
R 8	Motstånd, comp Resistor, comp	2.2 kohm	0.25W	5 %	Vitrohm or equiv	
R 9	Motstånd, var Resistor, var	50 kohm	0.75W	20 %	Helipot or equiv	78 P
R 10	Motstånd, metall film Resistor, metal film	2 kohm	0.125W	1 %	Vitrohm	CEA
R 11	Motstånd, metall film Resistor, metal film	6.8 kohm	0.125W	1 %	Vitrohm	CEA

MAGNETIC AB

Pos. Nr Pos. No.	Komponentbeskrivning Description	Värde Value	Effekt Arb. sp. Rating	Tolerans Tolerance	Tillverkare Manufacturer	Typ Nr Part No.
R 12	Motstånd, var Resistor, var	50 kohm	0.75W	20 %	Helipot or equiv	78P
R 13	Motstånd, metall film Resistor, metal film	2 kohm	0.125W	1 %	Vitrohm	CEA
R14	Motstånd, comp Resistor, comp	1.2 kohm	0.25W	5 %	Vitrohm or equiv	
R 15	Motstånd, comp Resistor, comp	5.6 kohm	0.25W	5 %	Vitrohm or equiv	
R 16	Motstånd, comp Resistor, comp	1.2 kohm	0.25W	5 %	Vitrohm or equiv	
R 17	Motstånd, comp Resistor, comp	8.2 kohm	0.25W	5 %	Vitrohm or equiv	
R 18	Motstånd, comp Resistor, comp	8.2 kohm	0.25W	5 %	Vitrohm or equiv	
R 19	Motstånd, comp Resistor, comp	8.2 kohm	0.25W	5 %	Vitrohm or equiv	
R 20	Motstånd, comp Resistor, comp	8.2 kohm	0.25W	5 %	Vitrohm or equiv	
R 21	Motstånd, comp Resistor, comp	1.5 kohm	0.25W	5 %	Vitrohm or equiv	
R 22	Motstånd, comp Resistor, comp	220 ohm	0.25W	5 %	Vitrohm or equiv	

MAGNETIC AB

Pos. Nr Pos. No.	Komponentbeskrivning Description	Värde Value	Effekt Arb. sp. Rating	Tolerans Tolerance	Tillverkare Manufacturer	Typ Nr Part No.
R 23	Motstånd, comp Resistor, comp	1.5 kohm	0.25W	5 %	Vitrohm or equiv	
R 24	Motstånd, comp Resistor, comp	220 ohm	0.25W	5 %	Vitrohm or equiv	
R 25	Motstånd, comp Resistor, comp	1.5 kohm	0.25W	5 %	Vitrohm or equiv	
R 26	Motstånd, comp Resistor, comp	220 ohm	0.25W	5 %	Vitrohm or equiv	
R 27	Motstånd, comp Resistor, comp	1.5 kohm	0.25W	5 %	Vitrohm or equiv	
R 28	Motstånd, comp Resistor, comp	220 ohm	0.25W	5 %	Vitrohm or equiv	
C 1	Kondensator, polyester Capacitor, polyester	0,033µF	250V	5 %	Rifa	PHE 240M533
C 2	Kondensator Capacitor	0,1 µF	100V	5 %	Rifa	PHE 240D610

E-001419 3 (6)

MAGNETIC AB

Pos. Nr Pos. No.	Komponentbeskrivning Description	Värde Value	Effekt Arb. sp. Rating	Tolerans Tolerance	Tillverkare Manufacturer	Typ Nr Part No.
C 3	Kondensator, ker Capacitor, cer	1nF	500V	N	Erie	831
C 4	Kondensator, ker Capacitor, cer	470 pF	500V	N	Erie	831
C5	Kondensator, ker Capacitor, cer	100 pF	500V	K	Erie	831
C6	Kondensator, polyester Capacitor, polyester	0.15 µF	250V	5 %	Rifa	PHE 240H615
C7	Kondensator, polyester Capacitor, polyester	0.022 µF	250V	5 %	Rifa	PHE 240H522
C8	Kondensator, ker Capacitor, cer	1nF	500V	N	Erie	831
C9	Kondensator, polyester Capacitor, polyester	0.047 µF	100V	5 %	Rifa	PHE 240D 547
C10	Kondensator, elyt Capacitor, elyt	100 µF	16V	10 %	Rifa	PEG 112 GE 310
C11	Kondensator, ker Capacitor, cer	1 nF	500V	N	Erie	831
C12	Kondensator, ker Capacitor, cer	1 nF	500V	N	Erie	831

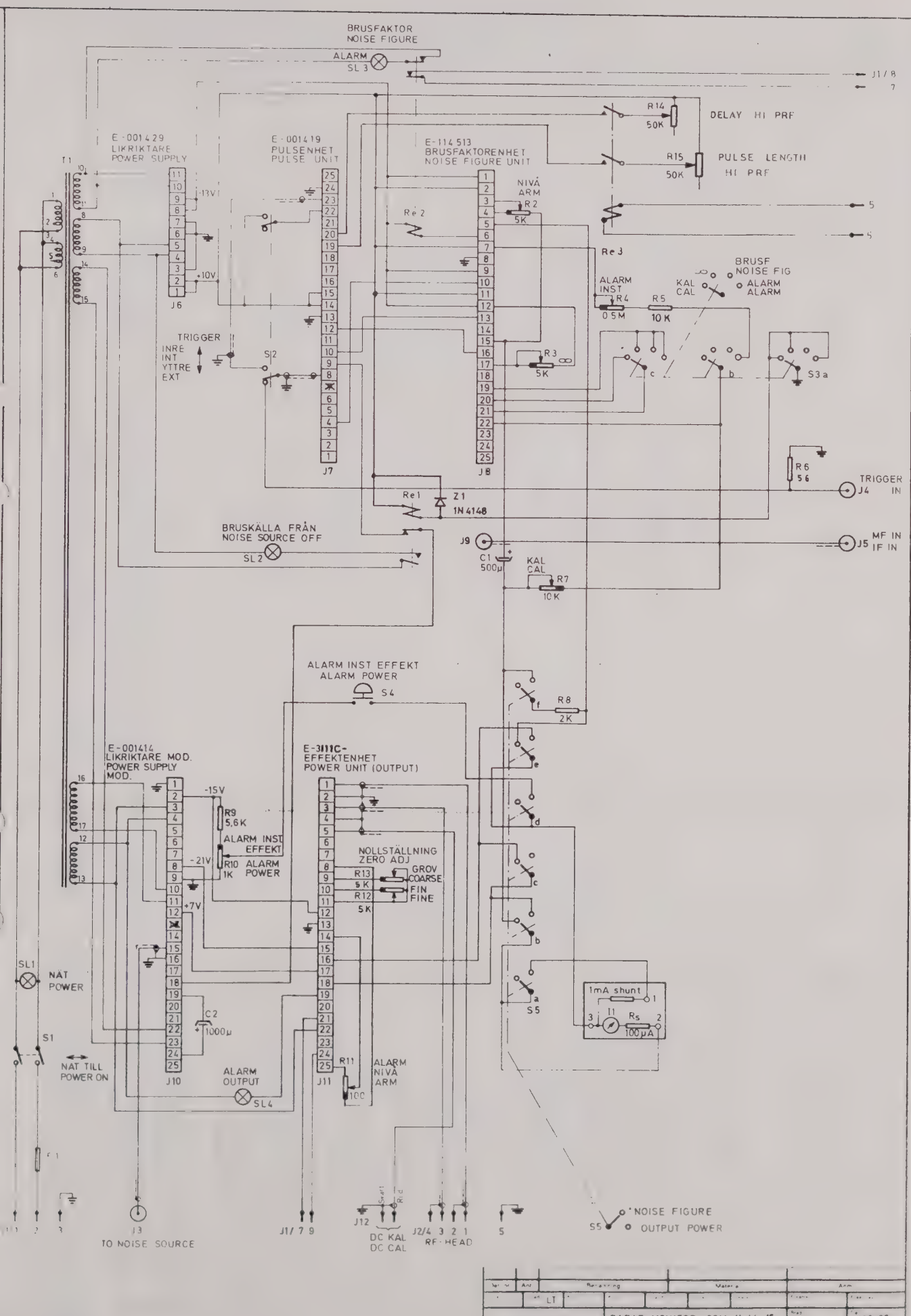
E-001419 4(6)

Pos. Nr Pos. No.	Komponentbeskrivning Description	Värde Value	Effekt Arb. sp. Rating	Tolerans Tolerance	Tillverkare Manufacturer	Typ Nr Part No.
V 1	Transistor UIJ Transistor UIJ					2 N 2646
V 2	Transistor Transistor					2 N 1711
V 3	IC IC	Dual One Shot			Amelco	342 CJ
V 4	IC IC	Dual One Shot			Amelco	342 CJ
V 5	IC IC	Quad 2-in put Buffer			Amelco	303 CJ
V 6	IC IC	Quad 2-in put Buffer			Amelco	303 CJ
Z1	Diod Diode					IN 4148
Z2	Diod Diode					IN 4148
Z 3	Diod Diode					IN 4148
Z 4	Diod Diode					IN 4148
Z 5	Diod Diode					
Z 6	Diod Diode					IN 4148

MAGNETIC AB

Pos. Nr Pos. No.	Komponentbeskrivning Description	Värde Value	Effekt Arb. sp. Rating	Tolerans Tolerance	Tillverkare Manufacturer	Typ Nr Part No.
Z7	Diod Diode					IN 4148
Z8	Diod Diode					IN 4148
Z9	Diod Diode					IN 4148
Z10	Diod Diode					IN 4148
Z11	Diod Diode					IN 4148
Z12	Diod Diode					IN 4148
Z13	Diod Diode					IN 4148
Z14	Diod Diode					1N4148
Z15	Diod Diode					1N4148
Z16	Diod Diode					1N4148
P1	Kontakt 25 pol Connector 25 ways	1 st 1 pc			ITT	12-211-001
	Nit Rivet	2 st 2 pc			ITT	14-014-002
	[illegible] Spacer	[illegible] 1 pc			[illegible]	[illegible]

E-001419 6 (6)


BRUSFAKTOR
NOISE FIGURE
ALARM
SL 3
J1/8
7
R14
50K
DELAY HI PRF
R15
50K
PULSE LENGTH
HI PRF
E-001429
LIKRIKTARE
POWER SUPPLY
E-001419
PULSENHET
PULSE UNIT
E-114513
BRUSFAKTORENHET
NOISE FIGURE UNIT
NIVÅ
LARM
R2
5K
Re 2
Re 3
BRUSF
NOISE FIG
ALARM
INST
KAL
CAL
ALARM
ALARM
R4
0.5M
R5
10 K
TRIGGER
INRE
INT
YTTRE
EXT
S2
R3
5K
S3a
R6
56
TRIGGER
J4 IN
Re1
Z1
1N4148
BRUSKÄLLA FRÅN
NOISE SOURCE OFF
SL2
J9
C1
500µ
KAL
CAL
R7
10K
MF IN
IF IN
J5
ALARM INST EFFEKT
ALARM POWER
S4
R8
2K
E-001414
LIKRIKTARE MOD.
POWER SUPPLY
MOD.
E-3111C-
EFFEKTENHET
POWER UNIT (OUTPUT)
-15V
R9
5,6K
ALARM INST
EFFEKT
-21V
R10
1K
ALARM
POWER
+7V
NOLLSTÄLLNING
ZERO ADJ
R13
5K
GROV
COARSE
R12
5K
FIN
FINE
1mA shunt
Rs
100µA
SL1
NÄT
POWER
S1
NÄT TILL
POWER ON
C2
1000µ
ALARM
OUTPUT
SL4
R11
100
ALARM
NIVÅ
LARM
S5
J10
J11
J7
J8
J6
T1
F1
J3
TO NOISE SOURCE
J1/7 9
J12
DC KAL
DC CAL
J2/4 3 2 1
RF-HEAD
5
NOISE FIGURE
OUTPUT POWER
MAGNETIC AB
Stockholm Sweden
RADAR MONITOR 3011-11,-14,-15
WIRING DIAGRAM
760108
E-3011019

POS.NR POS.NO.	KOMPONENTBESKRIVNING DESCRIPTION	VÄRDE VALUE	EFFEKT ARB.SP. RATING	TOLERANS TOLERANCE	TILLVERKARE MANUFACTURER	TYP NR PART NO.
C1 C2 x)	Kondensator, elyt Capacitor, elyt	500 uF	6,3 V		Rifa	PEG 118 DA 333
F1	Säkring Fuse	1 A Trög			Wickman	19241
	Säkringshållare Fuse holder				Wickman	19469
	Hatt till dito Cap to same				Wickman	19174
I1	Instrument					E-3011013
J1	Kontakt Connector	9 pol 9 pos			Cannon	DE-9P
J2	Kontakt Connector	15 pol			Cannon	DA-15P
	Låsfjäder Spring latch	2 st 2 pc			Amphenol	17-529
J3	Kontakt, koax Connector, coax	BNC			Amphenol	UG-290A/U
J4	Kontakt, koax Connector, coax	BNC			Amphenol	UG-290A/U
J5	Kontakt, koax Connector, coax					25 BNC-50-2-IC
x) C2	Kondensator, elyt Capacitor, elyt	1000 uF	63 V		Rifa	PEH 133 MB 410

Magnetic AB SWEDEN

Ritn.nr E-3011019

Benämning

Blad

POS.NR POS.NO.	KOMPONENTBESKRIVNING DESCRIPTION	VÄRDE VALUE	EFFEKT ARB.SP. RATING	TOLERANS TOLERANCE	TILLVERKARE MANUFACTURER	TYP NR PART NO.
J6	Kontakt 11 pol Connector 11 pos.	1 st 1 pc			ITT	12-302-021
	Kortkontakthållare Socket support	3 st 3 pcs			ITT	32-220-057
	Låsstift Fixing strip	6 st 6 pcs			ITT	14-005-001
J7	Kontakt Connector	25 pol 25 pos.			ITT	12-301-021
J8	Kontakt Connector	25 pol 25 pos.			Cannon	DBF-25S Flytande montage Float mounted
J9	Kontakt, koax Connector, coax				Cannon	DM-53743-5001 (RG=187/RG=188)
J10	Kontakt, Connector,	25 pol 25 pos			ITT	12-301-021
J11	Kontakt Connector	25 pol 25 pos.			Cannon	DBF-25S Flytande montage Float Mounted
J12	Kontakt Connector	Banan Banana			Hirschman	K 138 (1 röd + 1 svart)

Magnetic AB SWEDEN

Ritn.nr

Benämning

Blad

POS.NR POS.NO.	KOMPONENTBESKRIVNING DESCRIPTION	VÄRDE VALUE	EFFEKT ARB.SP. RATING	TOLERANS TOLERANCE	TILLVERKARE MANUFACTURER	TYP NR PART NO.
P1	Not assigned					
R2	Motstånd, var. Resistor, var.	5 kohm	0.5 W	10%	Clarostat	RV6L/AYSA 502A
R3	Motstånd, var. Resistor, var.	5 kohm	0.5 W	10%	Clarostat	RV6L/AYSA 502A
R4	Motstånd, var. Resistor, var.	1 Mohm	0.5 W	10%	Clarostat	RV6L/AYSA 504A
R5	Motstånd Resistor	10 kohm	0.5 W	5%	Vitrohm	104
R6	Motstånd Resistor	56 ohm	0.5 W	5%	Vitrohm	104
R7	Motstånd, var. Resistor, var.	10 kohm	0.5 W	10%	Clarostat	RV6L/AYSA 103A
R8	Motstånd Resistor	2 kohm	0.25 W	1%	Vitrohm	MEA T-1
R9	Motstand Resistor	5.6 Kohm	0.5 W	5%	Vitrohm	104
R10	Motstånd, var. Resistor, var.	1 kohm	1 W		Colvern	CRL 1206
R11	Motstånd, var. Resistor, var.	100 ohm	0.5 W	10%	Clarostat	RV6/LAYSA
R12	Motstand. var. Resistor. var.	5 Kohm	0.5 W	10%	Clarostat	RV6/LAYSA
R13	Motstand. var. Resistor var	5Kohm	0.5 W	10%	Clarostat	RV6/LAYSA

Magnetic AB SWEDEN

Ritn.nr

-3011019

Benämning

[illegible] 3011-11

[illegible]

Blad

3(6)

POS.NR POS.NO.	KOMPONENTBESKRIVNING DESCRIPTION	VÄRDE VALUE	EFFEKT ARB.SP. RATING	TOLERANS TOLERANCE	TILLVERKARE MANUFACTURER	TYP NR PART NO.
R14	Motstånd, var. Resistor, var.	50 k	0.5 W	10%	Clarostat	78P/3059Y
R15	Motstånd, var. Resistor, var.	50 k	0.5 W	10%	Clarostat	78P/3059Y
Re1	Relä Relay				Hi-G'Italia	CKS-A2-112
Re2	Relä Relay				Hi-G'Italia	CKS-A2-126
Re3	Relä Relay				Hi-G'Italia	CKS-A2-126
S1	Strömbrytare Switch	2 pol 2 väg 2 way 2 pol	250 V		APEM	5646
S2	Strömbrytare Switch	2 pol 2 väg 2 way	250 V		APEM	5646
S3	Strömbrytare Switch	3 pol, 4 vägs 3 pos. 4 ways			Metal Products	MB3
S4	Tryckknapp Push button	1 pol 1 pos.			Rafi	1002 N1-A
S5	Omkopplare, vrid Selector	1 gang 6 pol 2 väg 2 way	Kortslutande Shorting			Minibank 12

Magnetic AB SWEDEN

Ritn.nr E-3011619

Benämning RADARMONITOR 3JT1-11

Blad 4(6)

POS.NR POS.NO.	KOMPONENTBESKRIVNING DESCRIPTION	VÄRDE VALUE	EFFEKT ARB.SP. RATING	TOLERANS TOLERANCE	TILLVERKARE MANUFACTURER	TYP NR PART NO.
SL1	Lamphållare Lamp holder				Elit	52775 vit lins white lens
	Lampa, glim Lamp, neon	BA9S	110 V		Elit	5297
SL2	Lamphållare Lamp holder				Elit	52775 röd lins red lens
	Lampa Lamp	BA9S	35 V		Elit	5296
SL3	Lamphållare Lamp holder				Elit	5275 röd lins red lens
	Lampa Lamp		35 V		Elit	5296
SL4	Lamphållare Lamp holder				Elit	5275 röd lins red lens
	Lampa Lamp		35 V		Elit	5296
T1	Transformator Transformer				Lintron AB	2799

Magnetic AB SWEDEN

Ritn.nr

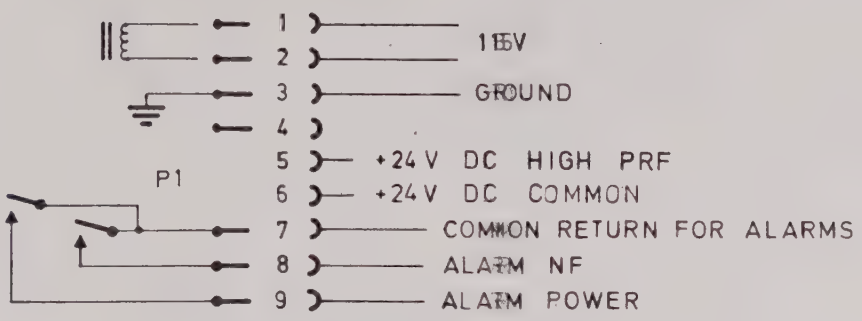
Benämning

PRESTANDAMETER

Blad

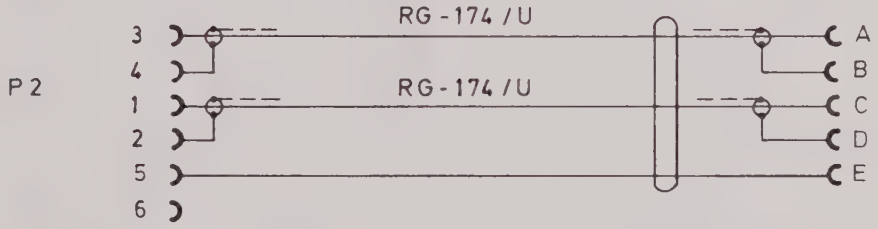
POS.NR POS.NO.	KOMPONENTBESKRIVNING DESCRIPTION	VÄRDE VALUE	EFFEKT ARB.SP. RATING	TOLERANS TOLERANCE	TILLVERKARE MANUFACTURER	TYP NR PART NO.
P1	Kontakt Connector	9 pol 9 pos.			Amphenol	D9s
Z1	Diode					1N 4148

Andr Bokst	Ändringens art	Dat.	Sign



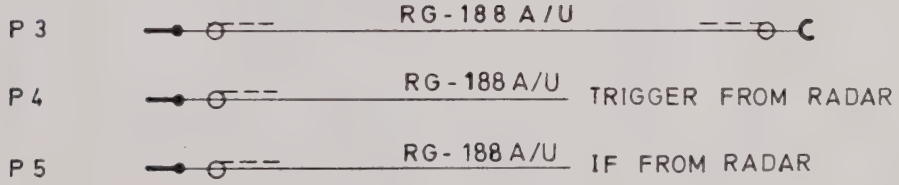
RF-HEAD

MS 3106-14s-5s



NOISE SOURCE

Amphenol 27-7 or equiv



CONNECTORS

P1 AMPHENOL 17-90090-16 / DE 44994
P2 AMPHENOL 17-90150-16 DA 20961
P3 ENC
P4 ENC
P5 ENC

Det.-nr	Ant	Benämning	Material	Anm

Konstr	Ritad L T	Kop	Kontr	Stand	Godk	Skala	Ersatter	Ersatt av

MAGNETIC AB

Stockholm Sweden

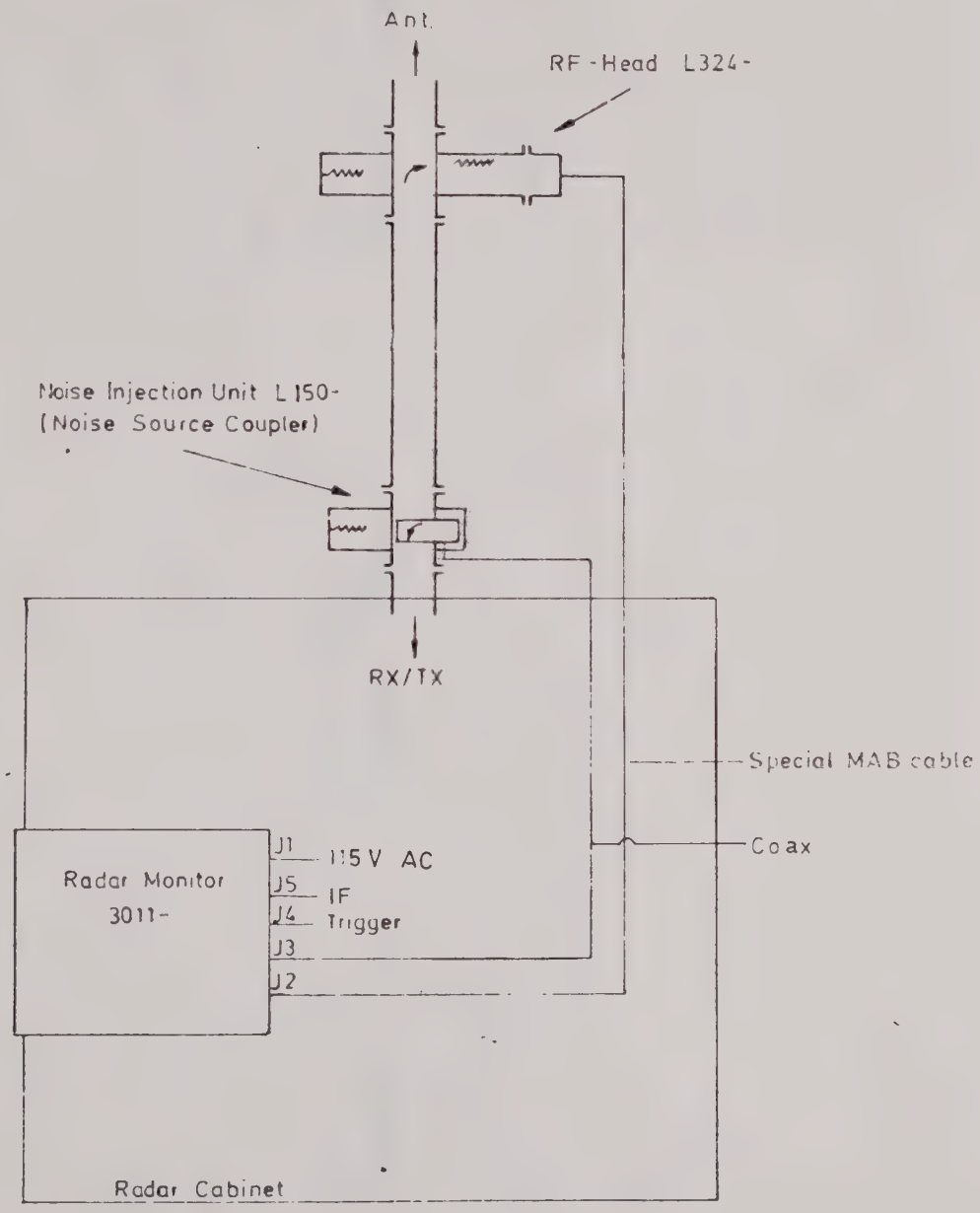
EXTERNAL CONNECTIONS

RADAR MONITOR 3011-

Blad	Dat. 760112
Ritn.-nr E-3011020	

Denna ritning är vår egendom och skyddad enligt gällande lag samt får ej utan vårt medgivande kopieras, delgivas annan eller obehörigen användas.

Ändr. Bokst	Ändringens art	Dat.	Sign.



Det. nr	Ant	Benämning	Material	Anm

Konstr	Ritad CG	Kop	Kontr	Grund	Grön	Skala	Ersätter	Ersatt av

MAGNETIC AB
Stockholm Sweden

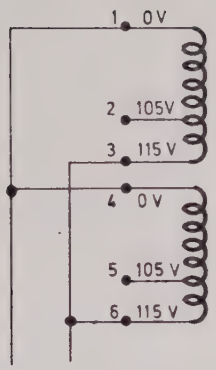
INTERFACE RADAR MONITOR TO TRANCEIVER 3011-

Blad

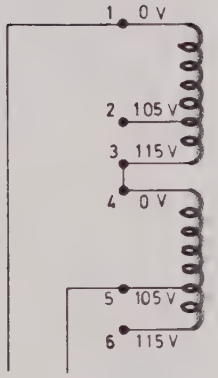
Dat. 75 10 02

Ritn. nr
E-3011015

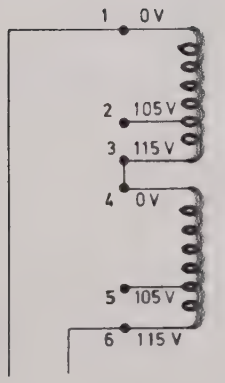
Denna ritning är vår egendom, och skyddad enligt gällande lag samt får ej utan vårt medgivande kopieras, delgivas annan eller obehörigen användas



115 V



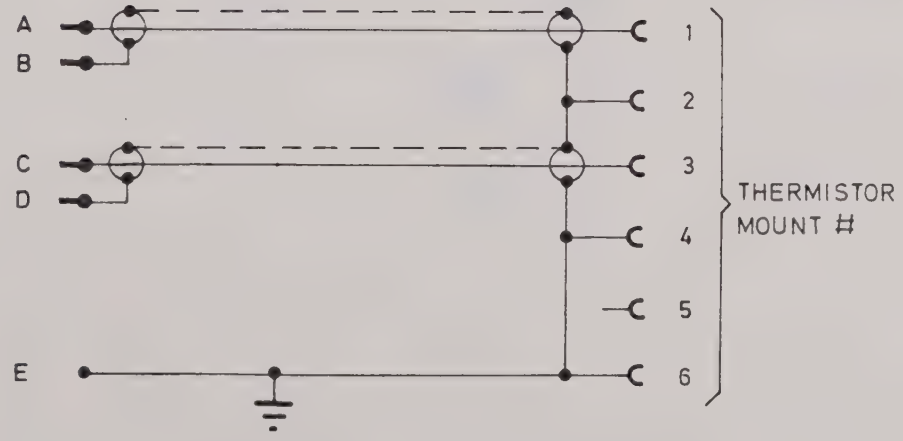
220 V



230 V

Magnetic AB SWEDEN	WIRING DIAGRAM FOR THE POWER-TRANSFORMER PRIMARY WINDING	73 1101
		E - 9155

DENNA RITNING FÖRBLIVER VÅR EGENDOM, ATT UTAN VÅRT MEDGIVANDE MÅNGFALDIGA, FÖREVISA, UTLÄMNA ELLER ELJEST OBEHÖRIGEN ANVÄNDA DENSAMMA ÄR FÖRBJUDET OCH BEIVRAS MED STÖD AV LAG AV DEN 30 MAJ 1919 SAMT LAG AV DEN 29 MAJ 1931 § 3



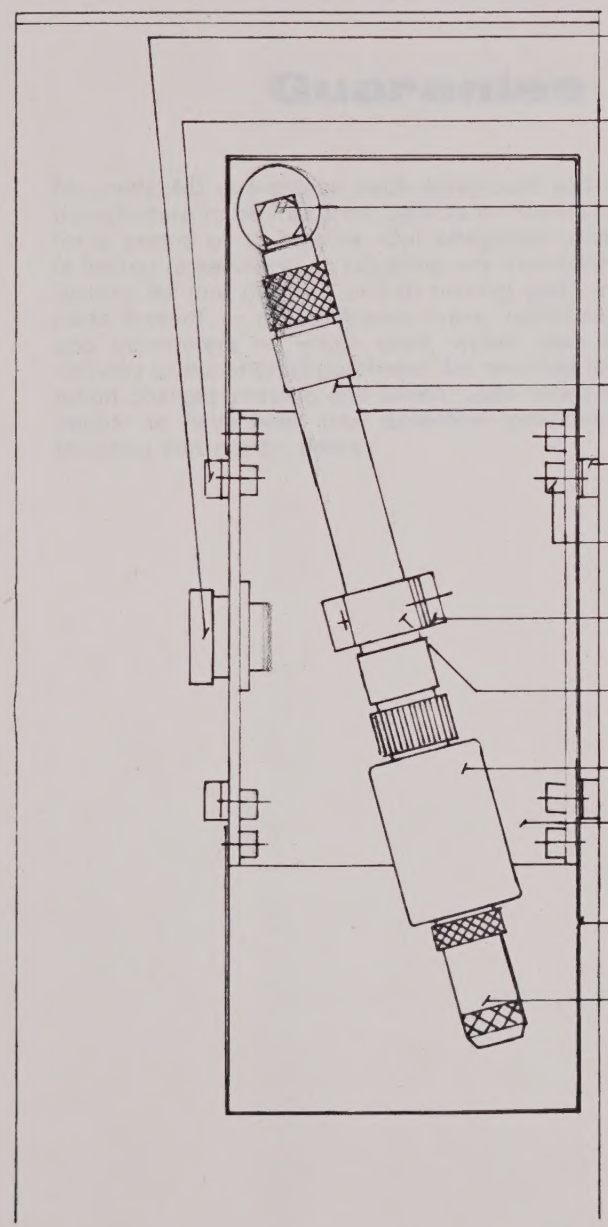
MS 3102-14S-5p

91-MC6F1

Det.-nr	Ant	Benämning	Material	Anm.
Konstr	Ritad CG / Kop / Konstr / Stand. / Godk. / Skala			Ersatter / Ersatt av

MAGNETIC AB Stockholm Sweden	HF-HUVUD L324- Principschema	HF-HEAD L324- Wiring diagram	Blad / Dat 20.1.70
			Ritn.-nr E-324051

Denna ritning ar vår egendom och skyddad enligt gällande lag samt får
utan vårt medgivande kopieras, delgivas annan eller obehörigen användas



Det.-nr	Ant.	Benämning	Material	Anm.

Konstr	Ritad	Kop.	Kontr.	Stand.	Godk.	Skala	Ersätter	Ersatt av

Magnetic AB
SWEDEN

L324-2
Layout
Låda, Sammanställning

Blad | Dat. 741107

Ritn.-nr E-324048

Ändr.
Bokst.

Guarantee

Magnetic AB guarantees each equipment and component of its manufacture to be free from defects in material and workmanship for a period of 12 months. Our obligation under this guarantee is limited to servicing or adjusting any instrument returned to our factory for that purpose and to making good at our factory and parts thereof — except tubes, fuses, batteries, semiconductors and bolometers — which shall, within one year after making delivery to the original purchaser, be returned to us with transportation charges prepaid and which, upon examination by us shall appear to have been thus defective, providing misuse or mal-handling can not be proved.

RETURN PROCEDURE:

When returning instruments or components for repair, or for any other reason, please contact the company for shipping instructions. To expedite repair service, it is very important to provide **type number, serial number,** and a **detailed description of the reason for the return of the instrument.**

Magnetic AB

Street Addr: Gårdsfogdevägen 18 A
Mail: Box 20036, S-161 20 Bromma 20, Sweden
Telephone: 08/29 04 60
Cable: Magnetic, Stockholm
Telex: 19037

MP MASTER

MA23608